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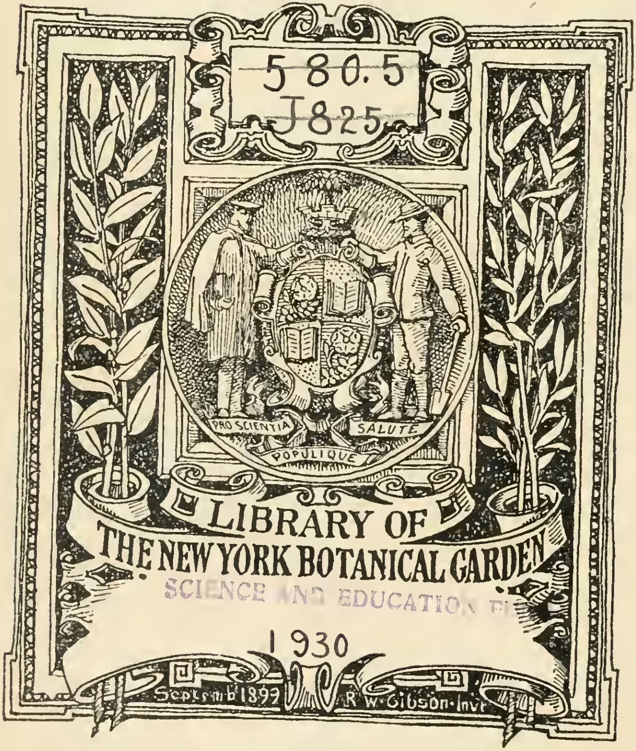

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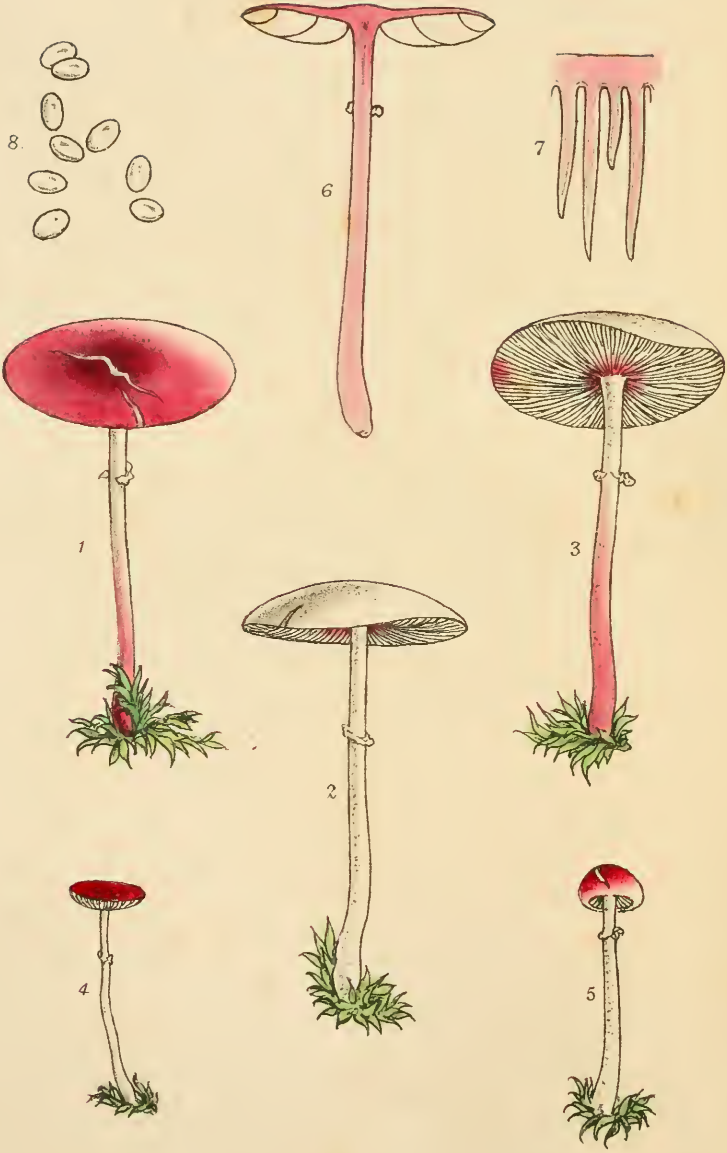

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Agaricus (Lepiota) georginæ. Sp. nov.

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AGARICUS (LEPIOTA) GEORGINÆ; A NEW SPECIES OF AGARICUS.

By Worthington G. Smith, F.L.S.

(Plate CXII.)

This elegant and curious *Lepiota* differs from any species hitherto described. Its specific characters are sufficient to distinguish it from the other *Lepiotæ*, but with the exception of one or two plants of the group, it may be readily recognized by its parasitic habit, the members of the subgenus, with the exceptions referred to, being all terrestrial. It is probably exotic, perhaps of Eastern origin, as I have not met with it elsewhere than in the cool fernery at Messrs. Veitch and Sons' Nursery, at Chelsea. It does not come up in the stoves and hothouses like some exotic species of *Lepiota*, but is confined exclusively to the *cool* fernery, where it may be found all through the year on different species of Mosses which grow amongst British Ferns and other hardy plants. Judging from its habitat, it seems reasonable to suppose that it may have been introduced with some of Messrs. Veitch's extensive importations from Japan and neighbouring territories.

It comes into Fries's section "Clypeolarii," and its nearest allies are *A. Badhami*, B. and Br., and *A. Meleagris*, Sow. One of its most striking peculiarities is its instantaneous change of colour from snow-white to blood-red when touched. So sensitive is it, that when gently laid with the pileus downwards on paper, the part of the surface in contact with the paper immediately changes colour, and if rolled over, it leaves a brilliant carmine stain wherever it touches. The portions of the gills nearest the stem are usually crimson, merely from accidentally coming in contact with the stem to which they are closely approximated though free. The red colour ultimately becomes dark brown, and after the lapse of a few hours from gathering, the Agaric loses its property of changing colour. Several other *Lepiotæ* change colour, but none have the remarkable sensitiveness of this species.

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Agaricus (Lepiotæ) Georginæ, sp. nov. *Pileus* white, slightly fleshy, fragile, at first campanulate, then expanded, ½ in. to 1 in. across, covered with a minute, dense, viscid pruinosity which, as well as the white flesh, instantly changes to crimson when touched; margin at length striate. *Stem* slightly attenuated upwards, 1 in. to 2 in. long, also covered externally with minute viscid pruinosity, changing to crimson when touched. *Annulus* evanescent. *Gills* free, very thin, moderately distant, somewhat ventricose, white, the edge becoming crimson when touched. *Spores* white, ·0003″ × ·0002″.

This species is scentless and tasteless, and the whole plant is extremely fragile. I have dedicated it to Miss Georgina Elizabeth Johnstone, Argyll Lodge, Campden Hill, in recognition of the zeal and success with which she has painted and studied the hymenomycetous Fungi of Inverary.

Explanation of Plate CXII.—Figs. 1, 2, 3, 4, 5. *Agaricus (Lepiota) Georginæ*, sp. nov. Fig. 6. Section of ditto. Fig. 7. Trama. Fig. 8. Spores × 700 diameters.

OBSERVATIONS ON THE SPECIES OF POTTIA ALLIED TO *P. TRUNCATA*, WITH DESCRIPTIONS OF THREE NEW SPECIES.

By William Mitten, A.L.S.

A specimen of the *Pottia*, mentioned by Dr. Braithwaite in the August number of this Journal, having been sent to me by Mr. Davies with a request that I would examine it, I have found it necessary in so doing to reinspect my specimens and to look over the descriptions of the species.

"*Pottia*" has been generally accepted as the generic name for a group of species, chiefly European, all which have an intimate agreement among themselves in their mode and places of growth as well as their small size, foliage, and general appearance; originally it was intended to include Gymnostomous species only, and those forms in which a peristome is developed were considered distinct and placed in the genus *Anacalypta* or *Weissia*. In Mueller's Synopsis, *Anacalypta* is reduced to a section of *Pottia*, and in Schimper's 'Synopsis of the European Musci,' although both genera are first employed, at the end of the work it is admitted that they must be united.

These Mosses, with some other analogous species in other natural groups, offer great difficulties to the learner: it was formerly easy to examine the capsule for a peristome,—if it had none, the species might be *Pottia*, if, however, a peristome was present, it must belong to some other genus; if the peristome had short teeth, it might be *Anacalypta*, but when the teeth were elongated it became *Desmatodon*. Individuals of the same species differ greatly in the amount of the peristome; in some examples the peristome is a short membrane with or without the rudiments of teeth at its upper edge, and between this and the comparatively complete peristome proper to *Anacalypta* every gradation may be found. These gradations in the development of an organ upon which not a few genera have been established, lead to the question where is the most completely developed peristome to be found among Mosses evidently most closely related to *Pottia?* The answer must be, in that group of the genus *Tortula* to which *Syntrichia* belongs, and the distinctions upon which *Anacalypta*, *Desmatodon*, and *Trichostomum* rest are barely of use as sections, for they fail to bring together the most nearly related species in every other particular except peristome. In several of the *Pottias*, even when the capsule is destitute of peristome, the cells of the operculum are seen to be arranged in a twisted manner, so that—as stated in the "Musci Indici" (Journ. of the Linn. Soc. 1859), and since by Lindberg in his review of the European *Trichostoma*—the peristome, if developed, must be also twisted or the teeth ascend obliquely, as is commonly the case in *Tortula*.

To return from this digression: it will be best to speak of these Mosses under the name of *Pottia*, as being that by which they are best known, and the British species may be separately distinguished in the following manner:—

- Leaves with accessory lamellæ on the nerve . . . . . . 1. *P. cavifolia.*
- Leaves without accessory lamellæ.
  - Calyptra scabrous.
    - Leaves obtuse . . . . 2. *P. Wilsoni.*
    - Leaves acute . . . . 3. *P. Starkeana.*
  - Calyptra smooth.
    - Leaves serrulate towards the apex.
      - Nerve not excurrent . . . . 4. *P. Heimii.*
      - Nerve excurrent . . . . 5. *P. lanceolata.*
    - Leaves quite entire.
      - Peristome always present . . . . 6. *P. cæspitosa.*
      - Peristome almost unknown.
        - Leaves in 5 rows.
          - Leaves smooth.
            - Capsule turbinate . . . . 7. *P. truncata.*
            - Capsule oval-cylindric . . . . 8. *P. littoralis.*
          - Leaves rough . . . . 9. *P. asperula.*
        - Leaves in 8 rows.
          - Nerve excurrent into a long point . . . . . 10. *P. crinita.*
          - Nerve forming a short point . . . . 11. *P. viridifolia.*

1. *P. cavifolia*, Ehrh., or rather as it should be *P. pusilla*, Hedw., is a well-marked species from the presence on the inner side of the nerve of the leaf of narrow lamellæ; in this it agrees with a species not yet detected in Britain, *P. subsessilis*, Brid., which from having its calyptra split on several sides forms the genus *Pharomitrium*, Schimper, Synopsis, p. 121; the resemblance is, however, so great that a natural arrangement must keep them in one genus. The variety of *P. pusilla*, with an elongated seta and capsule, enumerated in the 'Bryologia Britannica' as var. δ. *gracilis*, has the peristome of *Desmatodon*, which may be dissected out of the operculum, it is then the *Barbula cavifolia*, Schimper, Synopsis, p. 734, and the *Tortula lamellata*, Lindberg, De Tortulis, etc. Having gathered this form, my own opinion is that it is only a more complete state of *P. pusilla*, at the same time it must be admitted that intermediate states have not yet been found. Closely allied also to *P. pusilla*, are *Desmatodon nervosus*, which has the peristome variable in length and is really a *Tortula*, and *T. chloronotos*, Brid.

2. *P. Wilsoni*, Hook., with its obscure octofarious leaves, is a very distinct species; British specimens show hardly a trace of peristome, but others gathered at Hyères, by Sir W. C. Trevelyan, have a narrow membrane within the mouth of the capsule. The inflorescence is probably subject to variation, for the antheridia are sometimes included in a small bud as well as being free in the axils of the comal leaves. My specimen of the *Entothymenium mucronifolium*, Muell., is certainly *P. Wilsoni*, and is only a little more complete state than the French specimens; this synonym should, therefore, be removed to its proper place.

3. *P. Starkeana*, Hedw., or *Anacalypta Starkeana*, including its gymnostomous form, *P. minutula*, and its intermediate states, *Weissia affinis*, Hooker and Taylor, or var. *brachyodus*, is variable in the length of its capsule, which, when very long, is also as often gymnostomous as the states in which it is shorter, and presents every gradation in the amount of its development of peristome, from none to that attributed to *Anacalypta*. Mr.

Wilson (Bryol. Brit. p. 98) candidly admits that he "dares not pronounce *P. Starkeana* and *P. minutula* distinct;" yet has kept the two forms in the presumed distinct genera. The scabrous calyptra escaped the notice of the authors of the 'Bryologia Europæa.'

4. *P. Heimii*, Hedw., easily distinguished by its leaves, varies greatly in the length of its capsule, but although frequent search has been made for a peristome, in promising specimens none has been found.

5. *P. lanceolata*, Hedw. (*Anacalypta lanceolata*), although described with entire leaves, has always some trace of minute crenation near where its nerve is excurrent from the apex of its leaves. This species is very variable in its peristome, when gymnostomous it is probably *Gymnostomum intermedium*, Turner, and of Schwægrichen, Supp. t. 7, a form commonly referred to *P. truncata*, from which it may be distinguished by the crenation of the margin and rough cells of its leaves. The *Desmatodon Guepini* (Bryol. Europ. *Desmatodon*, t. 4) can hardly be other than a more complete form; no character is given in the description by which it could be safely distinguished.

6. *P. cæspitosa*, Bruch, is unlikely to be confounded with any other species excepting *P. Starkeana*, and from this it differs immediately in the smooth calyptra.

7. *P. truncata*, Bryol. Europ., may be truly *Gymnostomum truncatum*, Hedw. Fund. t. 5, but Hedwig has figured and described his species as dioicous,—a fact which seems to have been overlooked; it is certainly the *G. truncatum* of the Bryol. Germanica, t. 9. f. 8. This species has acute entire leaves with smooth cells; it varies greatly in its capsule, which is, however, always as wide at the mouth as it is lower down, and its usual form is turbinate; forms with an elongated capsule are probably in herbaria confused with the gymnostomous state of *P. lanceolata*. Mueller says in his 'Synopsis,' p. 554, that he has met with the peristome.

8. *P. littoralis*, n. sp.; leaves oblong-subspathulate, obtuse or acute, the lower ones pale, the upper green; cells in the upper part of the leaf about half the size of those of *P. truncata*, hence more obscure, smooth; lower cells oblong, pellucid; nerve excurrent, longer in the inferior leaves; capsule oblong-oval, mouth less than the greatest diameter; operculum rostrate, slightly twisted; male flower bud-like. Hab. Aldrington, near Brighton, Sussex, growing with *P. Heimii*, also at Hastings. The oval capsule, not dilated at the mouth, gives this Moss a greater similitude to *P. lanceolata* than to *P. truncata*, but from this it differs in the smooth leaves. I formerly mistook this Moss for *P. crinita*, from which it differs in the quinquefarious arrangement of its leaves, and much shorter and more slender nerve, as well as in its smooth cells.

9. *P. asperula*, n. sp.; leaves obovate-spathulate, acute, but not acuminate; nerve excurrent into a short point, upper cells rounded, rather obscure, each with several elevated points, lower cells oblong, smooth, pellucid; capsule oval; operculum rostrate; cells slightly twisted; antheridia naked in the axils of comal leaves. Hab. Henfield, Sussex, near Penzance, in several places, Mr. Curnow; Jersey, M. Piquet; also in Wilson's Musc. Brit. with *P. truncata*, n. 90. This has more obscure leaves than *P. truncata*, and when they are bent over under the microscope the roughness of the cells is easily perceived. The capsule is not so wide at the mouth as it is about its middle. It is possible that this species may be sometimes confused with *P. lanceolata*, when that species is gymnostomous, but it has many points of difference.

10. *P. crinita*, Wils., is generally very readily distinguished from its allies by the long hair-like points of its leaves, which are obtuse, and its oval transparent capsule showing the sporangium not contiguous with the external walls; in its octofarious leaves it agrees with *P. Wilsoni*, but differs by its smooth calyptra, and in the areolation of its leaves.

11. *P. viridifolia*, n. sp. (*P. pallida*, Braithwaite, in Journ. of Bot. VIII. 255, non Lindberg); leaves obovato-spathulate, obtuse or slightly acute; nerve not very stout, excurrent into a short point; margin recurved about the middle; cells in the upper part hexagonal or nearly square, their external walls with minute protuberances, obscure with chlorophyll, lower cells oblong, hyaline, smooth; seta short; capsule oblong; lid rostrate; antheridia in the axils of the comal leaves. Hab. Plymouth, Mr. Holmes; also in Wilson's Musc. Brit., amongst additional specimens of *P. crinita*. From *P. crinita* this differs in its larger and wider leaves, with the upper cells less obscure and less evidently tuberculated, the lower cells less elongated, and the short and slender nerve.

P. pallida, Lindberg, belongs to this section of the arrangement, which is described in his review of the European *Tortulæ* and *Trichostomæ* as having octofarious, panduriform leaves with cells "lævissimis," the nerve long and fragile, the seta "aureoflava"; capsule "cylindrico-oblonga," gymnostomous; operculum rostrate, indistinctly twisted; calyptra smooth; antheridia in the axils of the comal leaves. This was gathered on the coast of Spain, and, from the precision of the description, must be distinct from all our British species.

TERNIO *EUGENIARUM* NOVARUM SINENSIUM.

Profert Henr. F. Hance, Ph.D., cæt.

I. *Eugenia (Syzygium) minutiflora*, sp. nov.; frutescens, glaberrima, ramis teretibus cortice fusco-brunneo vestitis, ramulis parum compressis, foliis oppositis coriaceis obovatis obtusissimis nunc subemarginatis supra lucidis costa impressa venis inconspicuis subtus subopacis costa prominula venisque tenuibus paulo elevatis margine recurvis 1–2½ poll. longis, ½–1¼ poll. latis in petiolum bilinealem cuneato-attenuatis, cymis axillaribus et terminalibus paucifloris foliis brevioribus, calycis tubo obconico tetragono vix lineam longo supra ovarium conspicue producto apice truncato segmentis dentiformibus, petalis orbiculatis (quatenus e florum nondum expansorum autopsia dijudicare liceat) singulatim deciduis.

In colliculo juxta oppidum Shui-tung, ad extremitatem australiorem prov. Cantoniensis, die 15 Novembris, 1866, collegerunt Sampson et Hance. (Exsicc. n. 13754.)

Pone *Syzygium buxifolium*, Hook. et Arn. collocanda; sed optime distincta, foliis majoribus, floribus minimis, calyceque prismatico.

II. *Eugenia (Eueugenia) Grijsii*, sp. nov.; undique glaberrima, ramis teretibus cortice fusco-cinereo obductis, ramulis tetragonis, foliis crebris oppositis et ternis tenuiter coriaceis oblongis obtusiusculis supra costa impressa venisque inconspicuis lævibus lucidulis subtus opacis sub lente tantum minutissime ferrugineo-punctatis costa venisque tenuibus prominulis margine recurvis 8–10 lin. longis 3–4 lin. latis in petiolum brevissimum cuneatis, pedunculis lateralibus solitariis unifloris bilinealibus, floribus cernuis, calycis basi bracteolis binis subulatis minimis fulti tubo oblongo-turbinato $3\frac{1}{2}$ lin. longo supra ovarium haud producto limbi segmentis 4 parvis triangulatis sinubus latis truncatis discretis, petalis . . .?

In provincia Fokien detexit cl. C. F. M. De Grijs. (Exsicc. n. 391.)

Syllisio buxifolio, Schauer, a me non viso, certe arcto juncta connubio, sed folia flores fulcrantia nequaquam deminuta, atque inflorescentia minime racemosa. Specimen in herbario valde refert *E. Vauthierianum*, v. Berg. e Brasilia.

III. *Eugenia (Eueugenia) pyxophylla*, sp. nov.; frutescens, glaberrima, ramis teretibus cortice fusco-cinereo obtectis, ramulis tetraquetris lineis 4 elevatis notatis, foliis crebris ternis coriaceis oblongo-linearibus basi angustatis apice obtusis supra lucidis costa impressa venisque inconspicuis subtus opacis costa prominula venisque tenuissimis paulo elevatis marginibus repandulis recurvis sub lente obscure pellucido-punctatis 9–12 lin. longis $1\frac{3}{4}$–3 lin. latis, floribus in racemum compositum terminalem ovoideum 9-linealem foliis paucis interstinctis digestis, pedunculis filiformibus plerumque bifloris basi bracteolis minimis munitis, alabastris turbinatis subtetragonis rugulosis sesquilineam longis, calycis segmentis late triangulatis basi approximatis, petalis orbiculatis liberis.

In prov. Kwang-si, a. 1866, coll. rev. J. R. Graves. (Exsicc. n. 13750.)

Præcedenti affinis; inflorescentia vero, floribusque multo minoribus distincta. Folia iis *Myrciariæ delicatulæ*, v. Bg. simillima.

A FEW NOTES ON MR. WATSON'S 'COMPENDIUM OF THE CYBELE BRITANNICA.'

By Hon. J. L. Warren, M.A., F.L.S.

The following rough notes and queries on Mr. Watson's admirable Compendium, are offered with some hesitation. They supplement the distribution (chiefly as regards the province of Mersey) of a few aggregate species and several subspecies. So many waifs and strays of alien vegetation have of late years been battering for admission at the doors of the London Catalogue, that I have ventured to illustrate, by some instances within my own observation, the tenacity and facility with which certain manifest aliens, colonists, and denizens have maintained their ground and rapidly multiplied their individuals in given spots within very limited periods of time:—

Callitriche platycarpa, Kütz. (p. 173.)—"Localities insufficiently on record." Confirm province 9. Tabley Lake, on the authority of Professor Hegelmaier, to whom I submitted a specimen thence. *C. hamulata*, Kütz., and *C. autumnalis*, L., were also verified by him from the same piece of water. This is the most southern English station for the latter; but as *Anacharis* is increasing in Tabley Lake, the *Callitriche* is rather difficult to find now. I found it, however, again, plentifully on the mud of Holford mill-dam, let off this year for repairs, some two miles west of the original station in the new edition of E. Bot., "near Tabley Lake boat-house."

Verbascum virgatum, With. (p. 253.)—Add province 9, within a curved enclosure. Twenty or thirty of these plants appeared in a clover-field in Plumley, near Northwich, in 1868 and 1869. Last year the field was already ploughed up when I visited it.

Mentha piperita, Huds. (p. 268.)—Usually considered a Cheshire native, and I have certainly found it four or five times within the county, but always under circumstances of suspicion. Once in a little Willow-bed just opposite a farmhouse; again, in a hedge-ditch, where I learnt a cottage and garden had once stood; then by the side of a runnel, with a farm-garden a little above it, etc.

Galeopsis versicolor, Curt. (p. 275.)—On the question of this being "a boreal variety of *Tetrahit*," note that it is perhaps the most characteristic and widespread flower of central Cheshire. The potato-fields, which it affects most, are often covered for roods with it. There is plenty of *G. Tetrahit* also, and they often grow together; but I never saw the slightest approach to intermediates between the two, and alive they are abundantly and I should say "specifically" distinct. It is only in the herbarium that likeness begins.

Chenopodium ficifolium, Sm. (p. 293.)—Add province 9, within a round bracket for greater caution; observed twice about rubbish and in a garden in the environs of the city of Chester this year, but nothing like so well established there as round London. After all, is this Chenopod a better native than *Mercurialis annua* and *Sinapis muralis*, plants to me of similar claims and environment? Three years ago I raised from Kilburn seeds a few plants of *C. ficifolium* at Tabley. It has even in this short space spread as a weed in different places through a kitchen-garden of two acres. *Rumex sanguineus* and *Datura Stramonium* have also maintained themselves there for many years in spite of hoeing and weeding.

Atriplex erecta, Huds. (p. 296.)—If this includes or equals *A. serrata*, Syme, province 9 (Cornfields about Knutsford) may be confidently added. Mr. Syme named thus for me our prevalent *upright* field *Atriplex*.

Rumex pratensis, M. and K. (p. 302.)—Add province 9. Several places in Tabley Hill Lane and elsewhere. I found the plant in Mersey as soon as I had learnt it in Middlesex. I fancy it occurs nearly everywhere, if known and looked for.

Hippophae rhamnoides, L. (p. 304.)—Is this ever or to what extent an inland plant in England? It forms an abundant and characteristic vegetation, lining and following the torrent-beds for miles in Switzerland, *e.g.* near Culoz.

Empetrum nigrum, L. (p. 305.)—The comital distribution of this seems worth tracing minutely. So large a slice of southern and central England wants reliable record of this plant, that any occurrence of it in zone 1 may prove worth chronicling. I was surprised to find *Empetrum* in a small marsh lying close into the town of Knutsford, on the south-east side, in the heart of the plain of Cheshire, and miles from anything that can claim the name of a hill. Of course, on the high lands of Cheshire, where Cheshire touches Yorkshire, running between Derbyshire and Lancashire, *Empetrum* is common enough. I should gladly know whether Stafford and Derby can show any records for *Empetrum* in their flat portions. Qy. Is not its climatic distribution curiously analogous to *Vaccinium Vitis-Idæa* to which I see zone 1 is denied? The presence of *Empetrum*, and former presence of *Saxifraga Hirculus* at Knutsford, point to one fact; they are both relics of a much older flora, when perhaps continuous morasses connected the now highly cultivated plain of Cheshire with the hilly districts of the north-east.

Mercurialis annua, L. (p. 309.)—I should say a colonist. Still it is curious to find it exactly in the same heterogeneous position, as it is about English towns, *e. g.* London, Brighton, etc.; about Continental cities, *e. g.* Paris, Florence, Rome; there also it is a stranger still, but a stranger with recognized rights, and a quarter of its own.

Allium oleraceum, L. (p. 332.)—Add province 9. In a field at Plumley, by Peover Eye Brook. Several hundred plants annually.

Blysmus rufus, Link. (p. 359.)—As Lancashire seems the most southern record hitherto for this, it is worth adding Chester to bring the species to a lower comital point south. It grows near the Shotwick rifle-butts, at a spot called "Sealands," near Chester.

Polygala eu-vulgaris. (p. 488.)—Add province 9; it grows by Peover Eye Brook, Holford, Chester,—*P. depressa*, Wend. being much the commoner local form, found, among many other places, in Tabley Park and Lower Peover Heath.

Ulex eu-nanus, Syme. (p. 497.)—I have gathered specimens near Lower Peover Heath, Chester, which I cannot distinguish from the typical form of Middlesex and Surrey heaths; but even at Lower Peover, as over nearly all Chester, *U. Gallii*, Planch., is the common form.

Anthyllis Dillenii, Schultz. (p. 497.)—Province 2, Sussex. Brighton racecourse.

Coronilla varia, L. (p. 499.)—Province 1. I found it in a wood above Dr. Freeman's house, at Somerleaze, near Wells. There was not much of it, and its presence there was no doubt accidental and casual. I put this on record as this species seems to be now in this country beginning to establish itself.

Epilobium eu-tetragonum, E. B. (p. 512.)—The northern limit may be extended to province 9, but I have only got one specimen from a lane in Lower Peover. I gathered this as evidently not "obscurum;" and submitted it to Dr. Boswell Syme, who named it "*eu-tetragonum*." But *E. obscurum*, Schreb., is the prevalent form in the district round Knutsford, and I believe in Cheshire.

Saxifraga umbrosa, L. (p. 517.)—It is perhaps worth notice that, from being evidently planted there a few years back, this has spread so much in many places in the pleasure-ground at Tabley, Knutsford, Chester, that any enthusiastic young botanist might hail it as a native there.

Aster Novi-Belgii, L. (p. 533), has maintained itself for many years in a plausible-looking corner of Tabley Lower Water; but has evidently blown or floated across some two hundred yards of lake-water, where there is, and has been from very old times, a herb-garden.

Ambrosia maritima, L. (not entered.)—Alien, casual; a single plant, in a clover-field in Plumley, near Northwich, Cheshire. I could, however, find no other aliens in the field to indicate whence this curious stray had reached us; but probably the clover-seed was Italian; the field was a lonely one, and removed from any horticultural influence.

Veronica peregrina, L. (p. 540.)—Knutsford racecourse; evidently a casual. Only a plant or two for a couple of years. Not far from it *Lepidium Draba*, *Medicago maculata*, and *C. Bonus-Henricus* have maintained themselves many years. Still there, 1870.

Bartsia serotina, E. B. 3 (p. 540.)—The *Bartsia* round Knutsford seems to me, who have studied both plants growing, sufficiently distinct as a "form" from the *Bartsia* of the cornfields round Brighton. I used to call the Cheshire plant "*serotina*," the Brighton one "*verna;*" but the Exchange specimens of Dr. Boswell-Syme seem to fix the names differently, as far as one can judge from *dried* specimens only. Note also, that the Cheshire *Bartsia* is more a plant of the roadsides than of the cornfields.

Chenopodium paganum, Reich., and *C. viride*, L. (p. 553.)—Add province 9 for both, Knutsford.

"*Polygonum nodosum*," (p. 555.)—Mere Mere Edge, Cheshire. A small, white-flowered semi-procumbent form, so named by an authority in whom much reliance may be placed. It bears a few glands. This is a very different state to the large, erect, dusky purple "*nodosum*" of our suburbs.

P. (aviculare) rurivagum, Jord.—Cornfields, common. *P. (aviculare) arenastrum*, Bor. (p. 556). Roadsides; common. Both plentiful round Knutsford.

Populus (tremula) glabra, E. B. (p. 560.)—If you cut down a hedge of Aspens, the shoots from the stoops, for the first year or two, bear leaves more like those of the black Poplar, and which you would never take for Aspen leaves if you had only an herbarium acquaintance with this tree. These leaves of the young rods are silky beneath. As the wood strengthens and regains its tree size, the leaves become glabrous and assume the ordinary Aspen shape.

Carex "*involuta*" (p. 591).—I have gathered from several places in Pickmere, Tabley, and near Knutsford, specimens to me identical with those distributed by the Exchange Club under this name. A *Carex* which is neither *ampullacea* nor *vesicaria* (though to me much nearer the former), will, I fancy, prove to have wide, though perhaps nowhere abundant, comital distribution in Chester.

MONOGRAPH OF THE GENUS XIPHION.

By J. G. Baker, F.L.S.

In the present paper I propose to attempt to characterize and classify a small group of *Iridaceæ* inhabiting the Mediterranean region, Orient, and Abyssinia, the published information respecting which is very much scattered, and when brought together needs a considerable amount of sifting and addition in order to make it accurate and complete. The species are several of them old garden favourites, the synonymy of which might be traced back to Clusius, Parkinson, Besler, and the Bauhins. The group, taking it as a whole, scarcely differs from *Iris* except in the character of the rootstock, which in *Xiphion* is a bulb and in *Iris* a rhizome. Although in floral characters the two come so near to one another, yet, in making a key to the genera of this Order and its neighbours, it is so convenient to use the character of the rootstock as one of high importance, that I prefer in this matter to follow the example of Tournefort and Miller to that of Linnæus, and to treat the two genera as distinct. It will be seen from the synonymy that in the matter of generic circumscription the views which have been taken by later authors are extremely diverse, and that *Xiphion*, as here defined, includes three of the genera of the most recent monographer of the Order.

Definition.—Perianthium corollinum, superum, tubo supra ovarium sub-

nullo vel elongato, limbi segmentis exterioribus obovato-spathulatis vel cuneatis imberbibus, interioribus oblanceolatis vel linearibus, sæpe multo minoribus, erectis vel patulis. Stamina 3, ad basin limbi segmentorum exteriorum inserta, perianthio breviora, antheris linearibus, filamentis filiformibus. Ovarium inferum, prismatico-cylindricum, triloculare, ovulis in loculo pluribus biseriatis horizontalibus; stylus cum perianthii tubo connatus; stigmata 3, petaloidea, crista bifida lobis lanceolatis dentatis instructa. Capsula coriacea, apice loculicide trivalvis, seminibus in loculo multis subglobosis.—*Herbæ perennes, bulbosæ, foliis duris graminoideis, floribus speciosis solitariis vel paucis cæruleo-violaceis vel flavis.*

Selection of Generic synonyms.

Xiphion, Tournef. Inst. i. 362. t. 189; Miller, Gard. Dict. edit. 6; Klatt, Linnæa, xxiv. 568.

Xiphion, section *Euxiphion*, Parlatore, Fl. Ital. iii. 304; Alefeld, Bot. Zeit. 1863, p. 297, ex parte.

Iris, Linn. Sp. Plant. 55, ex parte; Lam. Encyc. iii. 292, et auct. mult. ex parte.

Iris, subgenera *Xiphium*, *Hermodactyloides*, et *Scorpiris*, Spach, Ann. Sc. Nat. ser. 3. vol. v. p. 91–3; Walpers Ann. vol. i. p. 816.

Sisyrinchium, Tournef. Inst. i. 365, ex parte.

Moræa, Tenore, Ker et Sweet, ex parte.

Diaphane et *Thelysia*, Salisb. Hort. Trans. i. 303–4 (nomina sola).

Juno, Tratt. Answ. tom. i. p. 135.

Thelysia, Parlatore, Fl. Ital. iii. 316.

Gynandiris, Parlatore, Nuov. Gen. p. 49; Fl. Ital. iii. 308; Godr. Fl. Franc. iii. 246; Klatt, Linnæa, xxiv. 576.

Neubeckia, Alefeld, Bot. Zeit. 1863, p. 297, ex parte.

Costia, Willk. Bot. Zeit. 1860, p. 131; Willk. et Lange, Fl. Hisp. i. 144.

Coresanthe, Alefeld, Bot. Zeit. 1863, p. 298; Klatt, Linnæa, xxiv. 573.

Vieusseuxia, Hochst. in A. Rich. Tent. Fl. Abyss. ii. 305, ex parte.

Key to Subgenera and Species.

§ *Euxiphion.* Segmenta interiora limbi erecta, exterioribus æquilonga vel paullulum breviora. Filamenta libera.

- Bulbus membranaceo-tunicatus.
  - Tubus supra ovarium subnullus vel brevissimus.
    - Lamina segmentorum exteriorum limbo panduriformi duplo breviore.
      - Perianthium violaceum . . . . 1. *X. vulgare.*
      - Perianthium lutescens . . . . 2. *X. lusitanicum.*
    - Lamina segmentorum exteriorum limbo cuneato excedens . . . . 3. *X. latifolium.*
  - Tubus supra ovarium productus, cylindricus.
    - Limbus perianthii violaceus, 2–3-pollicaris.
      - Segmenta exteriora lamina 1 poll. lata in unguem cito angustata . . . . 4. *X. tingitanum.*
      - Segmenta exteriora 8–9 lin. lata, dimidio inferiore sensim angustato . . . . 5. *X. filifolium.*
    - Limbus perianthii lutescens, $1\frac{1}{2}$–2-pollicaris . . . . 6. *X. junceum.*
- Bulbus fibroso-tunicatus.
  - Tubus 2–3-uncialis. Folia vix ultra 1 lin. lata . . . 7. *X. reticulatum.*
  - Tubus nullus. Folia 3–4 lin. lata . . . . 8. *X. diversifolium.*

§§ *Gynandiris* (Parlatore). Segmenta interiora limbi erecta, exterioribus paullulum breviora. Filamenta cum stigmatibus deorsum connata.
Species sola . . . . 9. *G. Sisyrinchium.*

§§§ *Juno* (Tratt.). Segmenta interiora limbi patula vel deflexa, exterioribus 2–3-plo breviora et multoties angustiora. Filamenta libera. (= *Thelysia*, Salisb.; *Scorpiris*, Spach; *Costia*, Willk.; *Coresanthe*, Klatt.)

Acaules.
Perianthium saturate violaceum, limbo 2½–3-unciali, tubo 3–8 poll. longo . . . . 10. *X. alatum.*
Perianthium flavescens, limbo 1½–2-unciali, tubo 2–3 poll. longo . . . . 11. *X. palæstinum.*
Perianthium albidum, extus violaceo tinctum, limbo 1½–2-unciali, tubo 3–5 poll. longo . . . . 12. *X. persicum.*
Caulescentes.
Folia linearia, deorsum 5–6 lin. lata . . . . 13. *X. caucasicum.*
Folia lorato-lanceolata, deorsum 12–15 lin. lata . . . 14. *X. Aucheri.*

1. *X. vulgare*, Miller; bulbo ovoideo membranaceo-tunicato, caule firmo flexuoso 1–2-pedali uni- vel raro bi-floro, foliis caulinis 4–6 distichis falcatis angustissime linearibus, deorsum dorso semiteretibus, seorsum filiformibus, spathæ valvis lanceolatis haud ventricosis ad basin limbi attingentibus, pedicello 1–3-unciali, perianthii tubo subnullo, limbo violaceo, segmentis exterioribus 2–2½-uncialibus intus flavo carinatis, lamina rotundata ungue panduriformi duplo breviore, segmentis interioribus erectis et stigmatibus (cum cristis) segmentis exterioribus subæquilongis.—*X. vulgare*, Mill. Dict. edit. 6; Parlat. Nuov. Gen. p. 45; Fl. Ital. vol. iii. p. 307; Alefeld, Bot. Zeit. 1863. p. 297. *X. angustifolium*, Klatt, Linnæa, vol. xxiv. p. 569. *X. verum*, Schrank. *Iris Xiphium*, *β*, L. Sp. Plant. edit. 2. p. 58; *I. Xiphium*, Ehrh. Beitr. vol. vii. p. 139 (ex parte); Bot. Mag. t. 686; Rédouté, Lil. vol. vi. t. 337, et mult. aliorum, non Jacq. vel Desf. *I. variabilis*, Jacq. Coll. vol. ii. p. 231.

Bulb ovoid, 9–12 lines thick, with several dark brown membranous coats and a tuft of fibrous rootlets from the base. Stem 1–2 feet high, erect, with 1 or rarely 2 flowers, firm, terete, flexuose, with 3 or 4 falcate leaves placed laxly on each side distichously, the lowest a foot or more long, linear-filiform, 3–4 lines broad where they leave the stem, the upper part quite filiform, the lower half rounded on the back, glaucous-green, glabrous, persistent. Valves of spathe 2–3 inches long, 4–6 lines broad, lanceolate, scariose, about 3 inches long, usually reaching up to the base of the limb at flowering time, hardly at all ventricose. Pedicel 1½–3 inches long within the spathe. Ovary cylindrical, 12–18 lines long. Tube scarcely any. Limb 2–2½ inches deep, usually deep violet-purple, sometimes paler; outer divisions keeled with yellow internally, with a spreading roundish lamina 8–12 lines broad, and an erecto-patent panduriform claw about twice as long as the lamina, 3–4 lines broad at the middle; inner divisions erect, concolorous, oblanceolate, 5–6 lines broad, nearly as long as the inner ones. Stigmas parallel with the outer divisions and very nearly as long, ligulate, 4–5 lines broad below the bifid crest, the lobes of which are ½ inch deep, crenulate on the outer edges.

Hab. Portugal, Welwitsch, 354! Frequent throughout Spain, ranging in altitude from the coast-level to 6000 feet, Boissier! Bourgeau Exsicc. 1849. n. 466! Exsicc. 1850. n. 891! Willkomm, 60! etc. France, salt marshes of Roque Haute, near Béziers, Hérault, Fabre! and said by Parlatore to have been found by Requien in Corsica. Flowers from April to June.

I. spectabilis (Spach, Hist. Phan. vol. xiii. p. 20; Ann. Sc. Nat. 3rd series, vol. v. p. 93) appears to be a garden hybrid between this species and *X. vulgare*. Judging from the description, *I. serotina*, Willk. Prodr. Hisp. vol. i. p. 141, from the province of Jaen in Spain, is very nearly the same plant, but I have not seen specimens. An excellent series of uncoloured figures of this and the two following, the series thirteen in number, will be found in the 'Hortus Eystettensis' of Besler.

2. *X. lusitanicum*, Alefeld; bulbo ovoideo membranaceo-tunicato, caule firmo pedali vel sesquipedali, uni- vel raro bi-floro, foliis 4–6 distichis falcatis, angustissime linearibus, deorsum dorso semiteretibus, seorsum filiformibus, spathæ valvis lanceolatis ventricosis ad basin limbi attingentibus, pedicello ovario subæquante, perianthii tubo subnullo, limbo flavescente, sæpe fundo rubro-brunneo tincto, segmentis exterioribus 2½–2¾-uncialibus, lamina rotundata ungue panduriformi duplo breviore, segmentis interioribus oblanceolatis exterioribus æquilongis, stigmatibus cum cristis limbo distincte brevioribus.—*X. lusitanicum*, Alefeld, Bot. Zeit. 1863, p. 297. *X. sordidum*, Salisb. Hort. Trans. vol. i. p. 303. *Iris lusitanica*, Gawl. Bot. Mag. t. 679; Spreng. Syst. Veg. vol. i. p. 159; Boiss. Voy. vol. ii. p. 603; Spach, Ann. Sc. Nat. ser. 3. vol. v. p. 93. *I. sordida*, Soland. in Herb. Mus. Brit. *I. juncea*, Brotero, Fl. Lusit. vol. i. p. 51; Webb. It. Hisp. p. 9, non Desf. nec Willk. et Lange, Prodr. Hisp. vol. i. p. 142, quoad descriptionem. *I. Xiphium*, Ehrh. Beitr. vol. vii. p. 139, ex parte.

Bulb ovoid, 12–15 lines thick, with several brown membranous coats; the rootlets fibrous. Stem 12–18 inches high, firm, erect, terete, usually 1-headed, with 3–4 falcate leaves laxly placed on each side, linear-filiform, the lowest 8–12 inches long, 2–3 lines broad where they leave the stem, semiterete at the back, subglaucous, persistent. Valves of spathe 2–2½ inches long, lanceolate, ½ inch broad, reaching up to the base of the limb at the flowering time, considerably ventricose. Pedicel and ovary each 12–15 lines long. Tube of perianth scarcely any. Limb 2½–2¾ inches long, pure yellow or tinged in the lower half with dull purple (*X. sordidum*, Salisb.); outer divisions with a round lamina an inch broad, twice as long as the panduriform limb, which is half an inch broad in the middle; inner divisions oblanceolate, erect, as long as the outer ones, 5–6 lines broad. Stigmas, including the crest, distinctly shorter than the divisions.

Hab. Portugal; frequent in the neighbourhood of Lisbon, especially at the foot of the Serra de Cintra and in other places, Brotero; Welwitsch, 356! Webb! Sir W. C. Trevelyan! etc. Flowers in March and April.

This comes extremely near *X. vulgare* in everything but the colour of the flower, and some of the plates of Besler's 'Hortus Eystettensis,' quoted by Ehrhart for his *I. Xiphium* evidently belong to it.

3. *X. latifolium*, Miller; bulbo ovoideo magno membranaceo-tunicato, caule firmo flexuoso sæpe bipedali, uni- vel bi-floro, foliis caulinis 4–6 distichis falcatis, anguste linearibus dorso semiteretibus, spathæ valvis lanceolatis, ventricosis ad vel ultra basin limbi attingentibus, pedicello ovario subæquante, perianthii tubo subnullo, limbo violaceo segmentis exterioribus 2½–3-uncialibus intus flavo carinatis, lamina rotundata ungue cuneato excedente, segmentis interioribus erectis et stigmatibus (cum cristis) segmentis exterioribus distincte brevioribus.—*X. latifolium*, Miller, Dict.

edit. 6; Alefeld, Bot. Zeit. 1863. p. 297; Klatt, Linnæa, vol. xxiv. p. 570. *X. Jacquini*, Schrank. *Iris xiphioides*, Ehrh. Beitr. vol. vii. p. 140; De Cand. Fl. France, vol. iii. p. 238; Bot. Mag. t. 687; Rédouté, Lil. t. 212, et mult. aliorum. *I. Xiphium*, *a*, L. Sp. Pl. edit. ii. p. 58. *I. Xiphium*, Jacq. Coll. vol. ii. p. 320. *I. pyrenaica*, Bubani, Sched. Crit. p. 3.

Bulb ovoid, 1½-2 inches thick, with several dark brown membranous coats and a tuft of fibrous rootlets from the base. Stem 1½-2 feet high, firm, flexuose, terete, with 1 or 2 flowers, with 3-4 falcate leaves placed laxly at each side distichously, the lowest a foot or more long, linear, semiterete on the back, 4-6 lines broad where they leave the stem, subglaucous, persistent. Valves of spathe 3 inches or more long, 6-9 lines broad, ventricose, frequently exceeding the base of the limb at the flowering time. Ovary and pedicel each 15-18 lines long. Tube scarcely any. Limb 2½-3 inches long, usually deep violet-purple, sometimes paler; outer divisions keeled with yellow internally, the round lamina 15-21 lines broad and deep, exceeding the cuneate claw; inner divisions erect, oblanceolate-spathulate, ½ inch broad, a quarter or a third of their length shorter than the outer ones. Stigmas equalling the inner divisions, ½ inch broad below the bifid crest.

Hab. Common in the meadows of the Central Pyrenees, both upon the French and Spanish flanks, Bentham! Endress! Gay! Bourgeau!; etc. Asturias, in the damp meadows of the subalpine region, Durieu! Flowers in July and August, which is much later than any of its allies.

4. *X. tingitanum*, Baker; bulbo ovoideo membranaceo-truncato, caule firmo flexuoso uni- vel bi-floro pedali vel sesquipedali, foliis caulinis 4-6 distichis falcatis anguste linearibus dorso semiteretibus, spathæ valvis lanceolatis ad basin limbi attingentibus, pedicello ovario subæquilongo, tubo pollicari vel sesquipollicari, limbo violaceo segmentis exterioribus 3-3½-pollicaribus lamina rotundata ungue panduriformi duplo breviore, interioribus oblanceolatis erectis exterioribus paullulum brevioribus, stigmatibus cum cristis segmentis interioribus æquilongis et æquilatis.—*Iris tingitana*, Boiss. et Reut. Pugillus, p. 113 (1852). *I. Fontanesii*, Godr. Fl. France, vol. iii. p. 245 (1855); Willk. et Lange, Prodr. Hisp. vol. i. p. 142? *I. Xiphium*, Desf. Fl. Atlant. vol. i. p. 37, non L.

Bulb ovoid, 12-18 lines thick, with several dark brown membranous coats and a tuft of fibrous rootlets from the base. Stem 12-18 inches high, firm, flexuose, terete, usually single-headed, with 3-4 falcate leaves on each side, semiterete on the back, 4-6 lines broad where they leave the stem. Valves of spathe lanceolate, 3-4 inches long, 6-8 lines broad, reaching up to the base of the limb, slightly ventricose. Pedicel and ovary each 12-15 lines long. Tube of perianth 12-18 lines long, cylindrical. Limb 3-3½ inches deep, bright violet-blue; the outer divisions with a yellow keel internally; the lamina roundish, an inch broad, twice the length of the panduriform claw; inner divisions oblanceolate-spathulate, erect, 8-9 lines broad, about ½ inch shorter than the outer ones. Stigmas as long as the inner segments, 6-7 lines broad at the base of the crest.

Hab. Tangiers, gathered by Salzmann in 1825 (v. s. specimens in Herb. Hooker and Gay), and also by Boissier. Algiers, in sandy thickets near Oran, Balansa, 238! Bourgeau!

To this belong all the African specimens I have seen labelled as "*Iris*

Xiphium." It may be easily distinguished from that species by having the tube prolonged for an inch or more above the ovary. It flowers from February to April. Willkomm and Lange report the plant from Algeciras, but it is by no means clear from their description whether it be what is here meant.

5. *X. filifolium*, Klatt; bulbo ovoideo membranaceo-tunicato, caule flexuoso sæpe bipedali 1–2-floro, foliis caulinis 4–6 distichis falcatis angustissime linearibus, sursum filiformibus, deorsum dorso semiteretibus, spathæ valvis 3–4-uncialibus leviter ventricosis ad basin limbi attingentibus, pedicello ovario æquante, perianthii tubo subunciali, limbo 2½–3-unciali saturate purpureo, segmentis exterioribus anguste obovatis dimidio inferiore sensim angustata, interioribus panduriformibus erectis distincte brevioribus, stigmatibus cum cristis segmentis interioribus æquilongis et æquilatis.—*X. filifolium*, Klatt, Linnæa, vol. xxiv. p. 571. *Iris filifolia*, Boiss. Voy. Esp. p. 602. t. 170; Willk. et Lange, Prodr. Hisp. vol. i. p. 142.

Bulb ovoid, 12–15 lines thick; the outer coat prolonged up the base of the stem and maculate with red-brown. Stem 1½–2 feet high, erect, with 2–3 very narrow leaves laxly placed on each side; the lowest 12–18 inches long, filiform upwards, not more than 1½–2 lines broad where they leave the stem. Spathe 3–4 inches long, slightly ventricose; the valves 5–6 lines broad, reaching up to the base of the limb. Ovary and pedicel each 15–18 lines long. Tube an inch long above the ovary. Limb a bright deep violet, 2½–3 inches deep; the outer divisions 8–9 lines broad, narrowed gradually from the middle to the base; the inner erect, panduriform, distinctly shorter, ½ inch broad; the stigmas as long as the inner divisions, ½ inch broad at the base of the crest.

Hab. Spain; mountains of Granada at an altitude of 3000–4000 feet, and in the neighbourhood of Gibraltar, Boissier, Keldart, Findlay! lately introduced into English gardens by Mr. Geo. Maw.

This is a little-known species, beautifully figured by Boissier. It comes nearest the last, but differs appreciably in the leaves and limb of the perianth. It is reported by Mr. Munby from Algeria, but is not the Oran plant which he intends by the name the last?

(*To be continued.*)

SHORT NOTES AND QUERIES.

Queries.—Perhaps it may not be foreign to the design of the 'Journal of Botany' if I suggest the introduction to its pages of queries. Difficulties, not to say problems, arise before all of us now and then, and when the query, with its solution from some one wiser than the querist, is of interest to botanists generally, it seems quite in order that it should be printed in these pages. I therefore submit several queries which I shall be glad to have answered, and in reciprocity I shall be equally glad to contribute what I may be able in the shape of replies to the questions of others.

1. Do the common Periwinkles, *Vinca major* and *V. minor*, ever ripen fruit in England?

2. In the 'Botanical Register,' under *Cratægus Oxyacantha*, var. *Oliveriana*, the common Hawthorn is said to have a black-fruited variety in English woods; where does this variety exist wild?

3. What is the physiological explanation of the acquired odour of *Anthoxanthum*, *Asperula odorata*, *Melilotus officinalis*, and other plants when dried? [See short note on *Coumarin*, p. 18.]

4. Does the common Sloe, *Prunus spinosa*, ripen its fruit regularly, if not plentifully, in the midland counties? Near Manchester, upon clay, near the sandstone and millstone grit, I have scarcely ever seen this shrub in fruit, and then *very* sparingly. Nothing is commoner in the hedges, or more conspicuous in its white bloom, in the month of April. Upon the slate rocks not far from Dolgelly, North Wales, this last autumn the hedges were quite purpled with the fruit.

5. The green colour of plants is said to result always from the action of sunlight, and the want of sunlight, it is said, causes them to be deficient in green. How is it that the cotyledons of the Sycamore are found to be a lively green when we strip off the hard and leathery carpel? Is the substance of the carpel in this instance translucent though opaque in seeming? What other instances are there of cotyledons being found green when the ripe seed is cut open? [*Convolvulus sepium* and *C. Soldanella*.]

6. Are there any *female* Lombardy Poplars in England?

7. What amount of genuine ripe seed is produced by the female Willows and Poplars of our country, the male plants being often at very considerable distances, excepting only *Salix Caprœa*, and perhaps another or two? Does the pollen get conveyed from one tree to the other? If so, by what agency? And what is the longest distance at which the female of a diœcious tree has been known to be fertilized from the male of the same species? Do the females of Poplars and Willows absolutely require the pollen from their own "species," or can they be fertilized by the pollen of some other species?—LEO H. GRINDON.

ASARUM EUROPÆUM, *L.* (Vol. VIII. pp. 84, 161).—In a seventeenth century MS. list of plants (Sloane MSS. 591) ascribed to Dr. John Pratt, which has additions in the handwriting of Daniel Foote, M.D., is the following (p. 7):—"Asarabacca. Asarum Matth. Ger., found in Somersetshire by Dr. Lob., Parkinson, p. 267, and on Einsham Common in Oxfordshire." The latter habitat is, perhaps, quoted from Howe's 'Phytologia' (cf. Vol. VIII. p. 161); the former I have not met with elsewhere. It has not, I presume, been recorded of late on reliable authority, as it is not given for Province 1 in any of Mr. H. C. Watson's works. Notwithstanding Journal (p. 161), province 5 is excluded in the Compendium Cyb. Brit., part ii. p. 305, part iii. p. 613.—ROBERT TUCKER.

CUSCUTA EPITHYMUM IN SHROPSHIRE.—I found this plant in a field near Burcott Gate in great luxuriance, September, 1870. *C. Epilinum* is the only species given in that excellent work, the Rev. W. A. Leighton's 'Flora of Shropshire,' and I am not aware that there exists any record of *C. Epithymum* being hitherto found in this county.—W. PHILLIPS.

ALYSSUM INCANUM, *L.* (Journ. Bot. VIII. 383).—I met with this plant in some abundance in a Clover-field near Mobberley, Cheshire, in July, 1870.—JAMES BRITTEN.

A NEW PARASITIC FUNGUS.—In the number of the 'Annales des Sciences Naturelles' issued in June, 1870 (ser. 5. vol. xi. p. 72), the last that has reached us, is an account by MM. Rose and Cornu of a Fungus (or Alga) parasitic on *Wolffia arrhiza*, which the authors regard as the type of a new genus, forming provisionally the extreme limit of the *Saprolegnieæ*, with points showing an affinity with the *Peronosporeæ*. They have named it

Cystosiphon pythioides. Any one who has kept *Wolffia* may have found after a while that many of the fronds become soft, dull, transparent, and of a pale yellow, and sink to the bottom of the water. It was such plants that were found to be affected by the *Cystosiphon.* The mycelium of the parasite penetrates the cellular substance of the frond, and the methods of its reproduction are carefully described and figured. There are two modes; in the asexual mode, which resembles that of *Pythium entophytum*, described by Pringsheim in his 'Jahrbücher,' vol. i. p. 289 and t. 21, zoosporangia are formed in the peripheral cells of the frond, the outer wall of which is ultimately perforated by a slender tube emitted from them; the extremity of the tube having reached the outer surface of the frond becomes enlarged and forms a vesicle, into which passes the fluid contents of the zoosporangium. This soon divides into several portions, each of which becomes a ciliated zoospore. On the rupture of the membrane of the mother-cell these escape into the surrounding water, and after active motion for twenty to fifty minutes settle down on the surface of other fronds of *Wolffia*, become spherical, acquire a cell-wall, lose their cilia, and germinate by sending out a mycelium, which penetrates the cell-walls of the host-plant. Sexual reproduction is effected by oögonia and antheridia, the contents of which mingle, and that of the oögonium contracts into an oval mass (oöspore), which soon becomes covered with a thick rugose covering. Its further history has not been traced.

POTAMOGETON ZOSTERIFOLIUS, *Schum.*, AT OXFORD.—I have seen specimens of this rare Pondweed, the *P. compressus*, L., of Fries, Koch, and the 'Student's Flora,' but not of Linnæus's herbarium, collected in July, 1870, by Professor M. A. Lawson in the Isis, near Oxford. Though the county of Oxford (or Berks) may be considered as hitherto unrecorded for the plant, not being admitted into any of Mr. Watson's summaries, yet, from the references, there is reason to think that by the *P. gramineum* of Sibthorp's 'Flora Oxoniensis' (p. 66) this species was intended. Few localities are on record in England for this easily-recognized and handsome species. It is likely to occur in other parts of the Thames water-system.—HENRY TRIMEN.

FLORA OF NEWFOUNDLAND.—During an ornithological trip to Newfoundland, from August, 1866, to August, 1868, I compiled a list of 372 species of Flowering-plants and Ferns in the island. Of these, the following are not included in Sir W. J. Hooker's 'Flora Boreali-Americana' (1840). The nomenclature is that of Professor A. Wood's 'Class-book of Botany,' New York, 1866.

Anemone narcissiflora.
Thalictrum alpinum.
Actæa spicata.
Alsine grœnlandica.
Paronychia canadensis.
Scleranthus annuus.
Archangelica peregrina.
Daucus Carota (introduced).
Viburnum Opulus.
V. pauciflorum.
Centaurea Cyanus (introduced).
Calluna vulgaris, Capelin Bay, 47° N. lat., 53° W. long. (see Journ. of Bot. II. 55, 154; III. 29, 121; IV. 305.)
Utricularia minor.
Betula nigra.
Pinus mitis.
Typha angustifolia.
Zostera marina.
Cypripedium candidum.
Spiranthes latifolia.
Juncus debilis.
J. acuminatus.
J. Conradi.
Eleocharis tenuis.
Cladium mariscoides.
Carex formosa.
C. comosa.
Agrostis scabra.
Panicum dichotomum.
P. lanuginosum.
Bromus ciliatus.
Poa trivialis.
Glyceria maritima.
Briza media (introduced).
Lolium perenne (introduced).
Spartina juncea.
S. alterniflora.
Osmunda regalis.
O. Claytoniana.

—HENRY REEKS.

SCLERODERMA GEASTER.—I see Dr. Bull is said to have first found this when on the "foray" in October last, but I found it several weeks before, and being unable to make it agree with any species in our English books, I took it down to the Hereford Meeting, and called Mr. Worthington Smith's attention to the fact of its changing to a dark brown colour when cut, a peculiarity not mentioned as pertaining to any English species hitherto described. I have several now growing in my garden, but only one bursts in the Geaster-like manner.—W. PHILLIPS.

PROTANDRY IN BUTOMUS UMBELLATUS, *L.*—During the summer of 1869 I observed this plant rather closely, and found that the pollen was discharged from the anthers before the stigmas became receptive. The stamens are somewhat erect before the discharge of the pollen, but afterwards fall back upon the perianth. A small globule of rather viscid, sweetish fluid appears between each carpel, and may probably attract insects for purposes either of cross- or of self-fertilization.—JAMES BRITTEN.

CUSCUTA HASSIACA, *Pfeiff.*—It may be well to place on record that Mr. John Dovaston, of Westfelton, Shropshire, sent me this plant, which he found growing this summer at Wigmarsh, near that place. It bids fair to become naturalized in England.—W. A. LEIGHTON.

MONSTROUS GROWTH IN A CAULIFLOWER.—A short time ago I received a cauliflower plant, of which the heart had been completely eaten out by the larvæ of the stag-beetle, which infested the garden where it grew. The injury had taken place when the plant was quite young, so that the scar was healed up; but, as is often the case when plants of the cabbage tribe have been similarly injured, all further growth seemed to have been arrested; and although the lower leaves remained green and healthy, there were no sprouts formed in their axils, nor any new shoots from the crown of the root. When the plant was pulled up, however, a strange abnormal growth was found to have taken place in the root. An immense number of buds had been produced from the lower part of the collar, and from the axils of many of the larger rootlets; and these had pushed their way, not up into the air, as might have been expected, but downwards into the soil, forming a dense mass of underground shoots, bearing rudimentary leaves, and which, after penetrating the soil a short distance, began to turn upwards.—ROBERT HOLLAND.

THLASPI PERFOLIATUM, *L.*—This interesting plant is somewhat uncertain in its occurrence in its localities, and seems to prefer broken limestone not too much disintegrated. Mr. H. Boswell found it, however, on cultivated ground near Woodstock, but on visiting the place with him another year we did not detect a single specimen. In 1869 I met with it very plentifully on the bare sides of the embankment, and even on the ballast between the rails, of the Great Western Railway from the Tetbury Road Station for about a mile towards Hayley Wood. A patch of very fine individuals occurred on a roadside bank close to the village of Sapperton. The Sapperton tunnel locality, first, I believe, given by Professor Buckmann, I did not verify; it is somewhat ambiguous, as there are two tunnels at Sapperton, the lower one carrying the Thames and Severn Canal over the watershed of the two rivers. Dr. St. Brody, who visited the place with me, thought that a spoil heap over one of the shafts of the tunnel was the original locality, but we failed to find the plant there.—W. T. THISELTON DYER.

COUMARIN is usually regarded as the chemical rather than physiological cause of the vernal-grass odour developed in the drying of some plants. It is an interesting instance of a vegetable product formed artificially. Perkin replaced the hydrogen in salicyl-hydride (oil of Meadowsweet) by sodium, and the sodium by acetyl. The salicyl-acetylide, losing a molecule of water, becomes Coumarin. (See Journ. Chem. Soc. 1868, p. 54.)—W. T. THISELTON DYER.

COUMARINE.—It has been commonly asserted that coumarine exists ready-formed in some half-dozen odorous plants. According to recent researches, however, it would seem that with one exception, that of the Tonquin Bean (*Coumaroma odorata*), these plants contain, not coumarine, but a combination of that substance with hydrocoumaric acid. Coumarine has a composition represented by the expression $C_9H_6O_2$, and the natural compound of this, above referred to, may be formulated thus, $C_9H_6O_2$, $C_9H_8O_3$. From this compound, after it has been extracted from the plant by alcohol, coumarine itself may be obtained by the action of a cold solution of ammonia. Coumarine has quite recently been formed artificially by Perkin. He acts upon the oil of Meadow-sweet (*Spiræa Ulmaria*), which is the hydride of salicyle, by means of sodium. He thus obtains a new substance, containing one atom of the metal sodium. This new substance, acted upon by anhydrous acetic acid, yields a compound named hydride of aceto-salicyle, which, when distilled, loses an atom of water and becomes coumarine; thus—

$$\underset{\text{Hydride of aceto-salicyle.}}{C_7H_5O_2, C_2H_3O} \quad - \quad H_2O \quad = \quad \underset{\text{Coumarine.}}{C_9H_6O_2}$$

According to some new experiments of my own, coumarine appears to exist, to a small extent, ready formed in the fresh leaves of the Northern Holy-grass (*Hierochloe borealis*), as well as in the Tonquin Bean. The compound of coumarine above mentioned has been found in *Asperula odorata*, *Angræcum fragrans*, *Anthoxanthum odoratum*, and *Melilotus officinalis*. The odour of these four plants becomes developed or more distinct on drying, some of the coumarine being thus probably set free.—A. H. CHURCH.

IRISH PLANTS.—*Sedum dasyphyllum ;* are we right in calling this certainly introduced ? It grows in a station hitherto unrecorded, near Midleton, county Cork, where it has every appearance of being truly wild, being abundant all over a group of low, rocky (limestone) hills in a retired spot. *Festuca Myurus* (Sm.) ; this is in Cyb. Hib., called very rare, only two stations being recorded for all Ireland. This certainly requires correction ; the species is abundant in Cork, and has no doubt been hitherto confounded with *F. sciuroides* (Roth). *Galium erectum ;* this species (in Cyb. Hib., Dublin only) grows abundantly in a pasture field near Midleton. It is also to be found sparingly on hilly pasture near Ballinacurra—introduced, I do not doubt.—T. ALLIN.

NOTE ON BURRIN, CLARE.—This season I found three species yet unrecroded from this district so interesting to botanists, viz. *Festuca Myurus*, *Linaria Elatine*, and a *Hieracium*, which is perhaps *anglicum*.—T. ALLIN.

MONSTROUS STATE OF INFLORESCENCE IN BRASSICA NIGRA, *Boiss.*—In the summer of 1868, when botanizing with the Rev. T. A. Preston at Aust Cliff by the Severn, I found amongst a number of individuals of this plant, some with their inflorescence very remarkably modified. I say modified, inasmuch as in every case, the plants were obviously affected by a minute white fungus, to which the changes from the normal state were no doubt due. As I was obliged at the time to put the specimens in spirit for future examination, I can say nothing about the fungus itself; it may, perhaps, have been *Uredo candida*, which Masters states ('Vegetable Teratology,' p. 279) to be a common cause of Chloranthy in Crucifers. Similar monstrosities seem to have come under Dr. Masters's notice, but I think mine sufficiently interesting for detailed description. The lower part of the rachis was normal in its appearance in every case, and bore ordinary immature pods. The upper part, however, measuring about three inches more or less, was very much hypertrophied, being about half an inch in thickness; all the flowers belonging to it were abortive. Where the hypertrophy had not been quite symmetrical, the axis was a good deal curled and twisted. The most curious feature was the change produced in the flowers. In one instance there was a kind of corymb of *chloranthous* flowers, each about half the natural size. In all the other cases, the flowers, with one, or very rarely two exceptions, were completely atrophied, while those which were not atrophied were very much hpyertrophied, measuring quite an inch across. This kind of balance between the atrophy and hypertrophy is somewhat curious if we look upon the enlargements as due to the growth of a mycelium in the tissues. The pedicel of the enlarged flower was generally about 1 in. long and ¼ in. thick. The sepals were spreading, each oblong, about ½ in. long, very fleshy,* and united at the base, occasionally forming a kind of dilated calyx-tube. The petals which, like the other parts of the flower were green, were twice their normal length, spathulate in form and with laciniate margins. The stamens in the flowers which were most symmetrically modified, were more or less distinctly *eight* and in two whorls, the outer opposite the sepals, the inner opposite the petals; all were about the same length when equally developed. The anther was represented by a kind of hooded leafy appendage turned upwards with a short, thumb-like claw, projecting from the opposite side of the filament. The ovary was about an inch in length, but except for its enlargement and the thickness of its walls, not otherwise altered; the ovules were larger than usual, but immature.—W. T. THISELTON DYER.

Extracts and Abstracts.

EXPERIMENTS ON THE TRANSPIRATION OF WATERY FLUID BY LEAVES.

(*From a Paper by W. R. M'Nab, M.D. Edin., Professor of Natural History Royal Agricultural College, Cirencester, read before the Botanical Society of Edinburgh, November 10th,* 1870.)

The experiments detailed in this paper were commenced in August last, and continued during September and October. The author's intention at first was merely to repeat some of the more important experiments made by other observers on the transpiration of watery fluid. The experiments, which numbered about 100, were conducted in the laboratory of the Royal Agricultural College, kindly placed at the author's disposal by Professor Church. In all the experiments *Prunus Laurocerasus* was used. The whole experiments may be arranged under eleven heads. I. Quantity of water in the leaves of the Laurel. This was determined by drying the leaves in the water bath at a temperature of about 100° Cent. until they ceased to lose weight. The total weight of water determined in this manner was found to be equal to (1) 63·4 per cent. of the total weight of the leaves employed.—II. Quantity of water which can be removed from the leaves by calcium chloride and sulphuric acid *in vacuo*.

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* Dr. Masters states (*l. c.* p. 428) that the parasitic Fungi produce enlargement of the perianth in *Capsella Bursa-pastoris*, DC., and other *Cruciferæ*.

(2.) Quantity of water which can be removed from the leaves by calcium chloride, 5·08 per cent.
(3.) Ditto, sulphuric acid *in vacuo*, 6·09 per cent.

By placing leaves in the sun, and allowing the fluid to transpire, only a limited quantity could be obtained, equal to (4) 5·8 per cent.—III. Amount of transpirable fluid in the stem and leaves at a given time. The uniformity of the results obtained above led to the conclusion that all the fluid in the plant did not, at a given time, exist in a transpirable condition. If, therefore, a quantity of fluid was transpired, and the loss supplied with some fluid easily detected in the plant, it followed that by causing, say, 7 per cent. of fluid to be transpired, the fluid used to replace that transpired ought to be found in every part of the branch. Lithium citrate in dilute solution was employed for the purpose. The lithium was then tested for by means of the spectroscope, and it was found that when 7·58 per cent. of fluid had been transpired by the leaves, the lithium could be detected all through the branch. The amount of transpirable fluid in the stem and leaves seems, therefore, to be about (5) 6 or 7 per cent., while the fluid in relation to the cell-sap will be (6) from 56 to 57 per cent.—IV. Rapidity of transpiration in sunlight, diffused daylight, and darkness. Three sets of experiments were made, each lasting for one hour. In another series the branches were placed in darkness for forty-eight hours. The results are as follows :—

(7.) Rapidity of transpiration in sunlight, one hour, 3·03 per cent.
(8.) Ditto, diffused daylight, 0·59 per cent.
(9.) Ditto, darkness, 0·45 per cent.

Branches placed in darkness for forty-eight hours in an ordinary atmosphere gave off a mean of (10) 13·47 per cent. in forty-eight hours.—V. Amount of fluid transpired in a saturated and in a dry atmosphere in the sun and in diffused daylight. In conducting these experiments, care was taken to have them done at the same time, so that the external condition of light, temperature, etc. would be the same. The saturated atmosphere was obtained by placing the branch to be experimented on under a beaker resting in water. To one side of the beaker a large piece of wet filter-paper was attached. The dry atmosphere was obtained by placing the branch under a bell-jar standing over mercury. Two tubes entered the jar, both connected with U tubes containing sulphuric acid. To one tube an aspirator was connected, and a gallon of dry air passed through the apparatus during the experiment.

(11.) Amount of fluid transpired in a saturated atmosphere in sun, one hour, 25·96 per cent.

(12.) Ditto, dry atmosphere, 20·52 per cent.

In the shade the results were very different.

(13.) Amount of fluid transpired in a saturated atmosphere in the shade, one hour, ·0 per cent.

(14.) Ditto, dry atmosphere, 1·69 per cent.

VI. Quantity of water taken up by leaves when immersed in it. The mean of several experiments gave, when the leaves were immersed for an hour and a half, (15) 4·37 per cent.—VII. Quantity of watery vapour absorbed by leaves in a saturated atmosphere. By placing branches in a saturated atmosphere for eighteen hours, they were found not to have lost weight in the least, or (16) ·0 per cent.—VIII. Differences in the amount of fluid transpired by the upper and under sides of leaves in the sun and in diffused daylight. One or both surfaces of the leaves were covered with plastic collodion, which formed a strong film on the leaf, and effectually prevented the transpiration of fluids.

(17.) Amount of fluid transpired by upper surface of leaf in sun, one hour, 1·34 per cent.

(18.) Ditto, under surface, 12·33 per cent.

(19.) Ditto, both sides coated with collodion, 0·96 per cent.

(20.) Ditto, by upper surface of leaf forty-eight hours in diffused light, 2·82 per cent.

(21.) Ditto, by under surface, 16·08 per cent.

(22.) Ditto, by both sides coated with collodion, 2·56 per cent.

IX. Relation of fluid taken up to that transpired and that retained by the plant. In these and the other experiments a branch of Laurel was taken, and fixed in a short test-tube containing a little water. The branch was passed through a cork, and the whole carefully closed with melted paraffin. By weighing the water in the tube, the branch and the whole apparatus, both before and after the experiment, the loss in the tube, the gain of the branch, and the amount transpired, could be determined.

(23.) Total amount of fluid taken up .	1·088 gramme.	Amount transpired .	0·640
Deduct . . .	1·038	Gain of weight of branch	0·398
Unaccounted for	0·05		1·038

(24.) Increase of weight of branch in saturated atmosphere, diffused daylight, forty-eight hours, 7·34 per cent.

(25.) Ditto, ordinary atmosphere, 7·14 per cent.

(26.) Ditto, ditto, darkness, 3·01 per cent.

X. Rapidity of ascent of fluid in plants. The experiments made under III. afforded data for measuring the rapidity of ascent of fluid in plants. The branch was placed in a test-tube, with a small quantity of solution of lithium citrate. The branch was then placed in the sun for a certain time, and when removed was cut in pieces, each piece consisting of an internode, petiole and leaf. These were measured, numbered, and carefully dried in the water oven. When dry, each portion was tested by means of the spectroscope for lithium.

(27.) Rapidity of ascent of fluid in plant (*a*) $8\frac{7}{12}$ inches in seventy minutes in sun. The lithium was found all through the branch. Transpiration in the sun equal to 7·58 per cent. per hour,
(28.) Rapidity of ascent of fluid (*b*) $9\frac{4}{12}$ inches in thirty minutes. Lithium citrate.
(29.) Ditto, (*c*) $5\frac{3}{12}$. Thallium citrate.
(30.) Ditto, (*d*) $6\frac{5}{12}$. Lithium citrate.
(31.) Ditto, (*e*) $4\frac{7}{12}$ inches in ten minutes. Lithium citrate.

In experiments *d* and *e* the lithium was not detected except in the stem, and not in the upper part of it. During these experiments, in which lithium was not found all over the branch, the transpiration was only equal to 4·53 per cent. per hour.—XI. Influence of gases in transpiration. Experiments with atmospheric air, oxygen, carbon dioxide, and nitrogen gave the following results:—

(32.) Transpiration of fluid in oxygen, one hour, sun, 12·77 per cent.
(33.) Ditto, atmospheric air, 7·5 per cent.
(34.) Ditto, carbon dioxide, 4·01 per cent.
(35.) Ditto, nitrogen, 1·97 per cent.

The bad weather and the lateness of the season terminated the experiments before several points of interest could be fully determined.

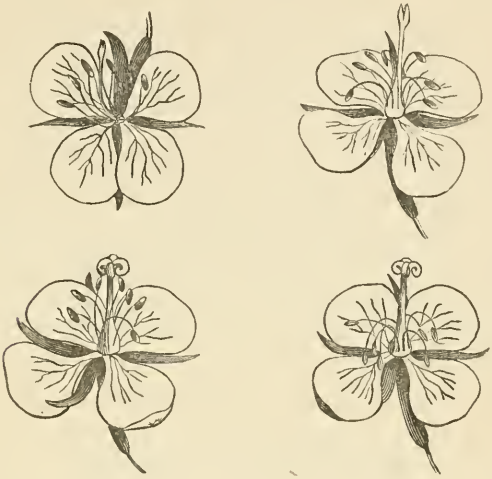
New Publications.

A Manual of Structural Botany. By M. C. Cooke. 12mo. Pp. 123.
London: Robert Hardwicke.

This new edition of a well-known little book, contains a very compendious and generally accurate account of all the terms used by descriptive botanists, and of a good many (*e.g.* lycotropal) that are not used. As a classified glossary of existing and partly obsolete botanical language, it will be found quite as useful as more pretentious books. The earlier sections contain an account of plant-chemistry, expressed with modern formulæ, and a sufficient explanation of physiological terms. Unfortunately terminology is not knowledge, and the educational value of this book in teaching anything about plants themselves, seems but small. What are wanted to start science in schools are, cheap but accurate expositions of facts, like Huxley's 'Elementary Lessons in Physiology,' not mere collections of dry-bones.

Mr. Cooke has not been very happy in his etymologies, though some of the worst of the previous edition have been suppressed. "A *Phytozoa*," with its plural "*phytozoæ*" (p. 97), are likely to bring scorn upon his labours from public schoolboys, on the principle of a ploughman's contempt for those who cannot plough.

As an interesting episode, the account of the fertilization of a British plant (pp. 71, 72) may be quoted:—"The Rosebay Willow-herb, *Epilobium angustifolium*, has a 4-lobed stigma, supported on a style rather longer than the filaments of the stamens. When the flower first opens, the lobes are closely applied together by their faces, and both style and stamens are pendulous. As the anthers approach maturity, the style becomes erect, and the stamens commence elevating themselves. By the time that the anthers are fully matured, the lobes of the stigma have divided and curled outwards and downwards in a circinate manner, so that they may be reached by the anthers, the filaments then become erect, and the pollen is discharged upon the lobes of the stigma. After discharging the contents of their anthers, the stamens droop and become pendulous again, whilst the style remains erect."



W. T. T. D.

On the Popular Names of British Plants, being an Explanation of the Origin and Meaning of the Names of our Indigenous and most commonly Cultivated Species. By R. C. A. PRIOR, M.D., Fellow of the Royal College of Physicians of London, and of the Linnean and other Societies. Second Edition. Williams and Norgate: 1870.

At page 378 of the first volume of this Journal, the first edition of this work was noticed, at some length; and it only remains for us to refer briefly to the second edition, which is now before us. It contains further evidences of the care and zeal with which Dr. Prior has followed out the study of an important subject; and also much interesting matter which was not in the earlier volume. Certain trifling errors are corrected, and the accounts of some of the names are condensed from the previous edition; but the body of the work remains the same. Although only published in 1863, it has been for some time impossible to obtain copies of the first edition; and we have little doubt that the interest which has been awakened, mainly by Dr. Prior's researches, in plant-names, will induce many to purchase what must be regarded as the standard work upon the subject of which it treats.

We notice that the list of "works referred to" is much extended, and that some names, such as "Tentwort," which were left unexplained in the first edition, are here traced to their origins. Some, however, such as "Paigle," yet remain to puzzle inquirers, as none of the explanations proposed can be considered satisfactory. A new derivation of "Cowslip" is given. A most important addition is the list at the end of the volume, in which all the English names are brought together under their respective Latin equivalents; in this way the want of a Latin index, which was felt in the first edition, is in a measure supplied. We note at p. 247 the statement that *Elodea canadensis* "has hitherto been generally known as Babington's curse.'" Is this foolish and misleading name in actual use? Parkinson applies the name "Jone Silver-pin" to *Papaver somniferum*, not to *P. Rhœas*, as stated by Dr. Prior. We do not know why the names Crowfoot, Buttercup, Goldcup, etc., are, in the "systematic" list, given only as equivalents of *Ranunculus acris*, in the body of the work they are more correctly given for *Ranunculus;* three species, at least, being generally so known. We should have been glad to have seen more local names in this edition, and we miss some of the more specially philological notes of the former one; but it would be ungracious to complain of a book which is simply invaluable to those who make any study of plant-names, and which cannot fail to interest any intelligent reader with philological or botanical predilections.

J. B.

Proceedings of Societies.

LINNEAN SOCIETY.—*November 3rd*, 1870.—G. Bentham, Esq., in the chair. Several communications were read from Dr. Mansel Weale, sent by Mr. Darwin, detailing the structure and mode of fertilization of South African species of *Habenaria*, of *Disa micrantha*, and of a species of *Disperis;* also of certain *Asclepiadeæ*. Some of the Orchids were believed to be self-fertilizing, but to need insect agency.

November 17th, 1870.—J. D. Hooker, C.B., F.R.S., Vice-President, in the chair. The only botanical paper was an elaborate "Memoir on *Passifloræ*," by Dr. Maxwell T. Masters, F.R.S., of which the author gave a general verbal summary, copiously illustrated by specimens and drawings. The memoir contains a full investigation of the morphology, biology, and systematic position of the Order, and of its generic and specific types. First, he spoke upon the morphology of the organs, dwelling on the nature of the tendrils, which here are abortive flower-branches, and the mode of development of the leaves and parts of the flower. The flower-tube, he maintained, was distinctly axial, and developed later than the other parts of the flower. The two sets of floral envelopes, though they fall together, he regarded as distinct in their nature, the outer a calyx of the ordinary quincuncial type, the inner a corona, of which the parts are produced simultaneously. With regard to the carpels, he criticized not only the theories but the alleged facts brought forward by Schleiden: Dr. Masters considered them as unmistakably appendicular. Next, he explained in detail the way in which in *Passiflora* and *Tacsonia* cross-fertilization is effected. In the fully-expanded flower, even when it is pendulous, the versatile stamens become extrorse through the hardening and curving of an elastic process at the top of the filament, and bees penetrate the flower and creep amongst the coronal fringes, upon which the pollen falls, to reach a process placed down deep in the tube which secretes nectar copiously. Relying upon the hypogynous insertion of the stamens in the typical genera, he inclines to place the Order in the vicinity of *Samydaceæ* and *Violaceæ*, and to regard *Modecca* and *Papayaceæ* as an intermediate link connecting it with *Cucurbitaceæ*. In treating the geographical distribution of the Order, he drew attention to the way in which the true Passion-flowers are concentrated in Brazil, with types mostly distinct in other parts of tropical America, and the remarkable way in which the single annual *Granadilla*, which the Jesuits named, and to which the legendary interest is attached, runs out some 20° to the north of the others, and yet can only be known from a common, variable Brazilian type by habit and duration. *Tacsonia*, as he restricts it, is confined to the west of the Andes, and, though it climbs in its native localities to great heights, seems always to need conservatory-heat in our gardens. There are a few true Passion-flowers in India, a small distinct group in Australia and Polynesia, and a single outlying species in Madagascar. In tropical Africa there are several curious, well-marked, small genera. It is now very difficult to trace to their original homes several of the generally cultivated types, such as *P. quadrangularis*, which have established themselves in widely-distant countries. The memoir enumerates and classifies all the known genera and species of the Order, but describes only the few species which the author has not already treated recently in his two monographs, still unprinted, in the 'Flora Brasiliensis' of Von Martius and Endlicher, and in the second volume of Oliver's 'Flora of Tropical Africa.'

Botanical Society of Edinburgh.—*Nov. 10th*, 1870.—Sir Walter Elliot, President, in the chair. The President delivered an opening address. In noticing the progress of botanical investigation during the year, he referred to the recent discoveries of the laws governing the fertilization of plants in the two great divisions of the vegetable kingdom. The observations of Darwin on the influence of the unequal lengths of stamens, and the agency of insects for the prevention of interbreeding among some kinds of flowering plants, have been followed by the discovery, in others, of the effects produced by the alternate arrival at maturity of the stamens and pistils,—thus necessitating the conveyance of the pollen from one individual to a different one, and so checking too close and intimate fertilization. In the non-flowering division he referred to the investigations still zealously prosecuted, by means of the microscope, into the obscure subject of the fertilization of cryptogamous plants, and traced the progress of the recent discussions on the germ theory and the question of spontaneous generation. He then noticed the interest that has been taken in the examination of the properties of Fungi, and the exertions of the Woolhope Naturalists' Field Club to discriminate between the poisonous and innocuous species, and noted the recently-published papers of Dr. Bull, of Hereford, Mr. Worthington Smith, Mr. Cooke, and others, on the subject. Amongst recently-published works on the general science, particular reference was made to the full and clear definition of characters in Dr. Hooker's 'Student's Flora of the British Islands,' and to the ample details of recent discoveries in the new edition of Part I. of Prof. Balfour's 'Class Book,' bringing down the progress of the science to the present day. After a short reference to Mr. Carruthers' researches into palæontological botany, the President gave an account of an attempt he had made to ascertain how far home botany had been promoted and extended by means of local scientific societies and field clubs. These have been found to be so numerous, and their researches to have been prosecuted with so much success, that he had been forcibly led to consider whether some means could not be devised for bringing about a more combined system of action, by which their labour might be economized and their discoveries made accessible to naturalists generally. This appeared the more feasible, as a tendency towards the same direction had been evinced in several quarters, some societies having already amalgamated, others having agreed to publish joint Transactions; and the idea of advancing such union having occurred independently without previous concert, in other quarters. The oldest local societies, none of which date before 1781, were shortly mentioned; and a sketch was given of the constitution and working of field clubs, the first of which came into existence in 1831. Now almost every county, and even division of the same county, has its own association for field investigation. A remarkable feature presented by these inquiries was the growing interest shown to be taken by artisans in natural history and scientific pursuits, several societies and field clubs having been formed by mechanics and tradesmen entirely among themselves, particularly in Lancashire and the metropolis. As a means of bringing about the union above adverted to, it was suggested that copies of the address should be circulated to the different societies which have so courteously and readily responded to the requests for information; with an invitation, should they concur in the views set forth, to take into consideration the means of combining their operations with kindred associations, so as to secure the greater amount of common good. The following papers were read:—"Experiments on the Transpiration of Watery Fluid by Leaves." By W. R. M'Nab, M.D. (see p. 19). "On the Law of Growth in Plants." By Col. T. B. Collinson, R.E. "Notes on *Wolffia Welwitschii*," Hegelm.; and on "Guachamacan." By A. Ernst, of Caracas, in a letter to Dr. Balfour. Specimens of the former were presented to the herbarium.

8th December.—Alexander Buchan, Esq., M.A., the newly-elected President, in the chair. The following communications were read:—"Botanical Excursions in July and August, 1870, with Pupils." By Professor Balfour. The first noticed was to Callander and Ben Ledi on 16th July. By the side of the road leading to Leny House, near the entrance to the Pass of Leny, *Œnanthe pimpinelloides* was gathered by Dr. Dickson and Mr. Sadler. Along with *Œ. pimpinelloides* was gathered *Pimpinella magna*. On 22nd July a party of twenty-six proceeded to Inverarnan, at the head of Loch Lomond, and next day ascended Ben Vorlich. On 4th August a more extended excursion took place to Killin and the Breadalbane Mountains. On 5th August they visited Craig Chailleach. Here *Sagina nivalis* was collected, and Dr. Balfour remarked that this was a new station for the plant. He had gathered it first on Ben Lawers in 1847, and again, in 1863, on Benean, one of the tops of Benmore. On 6th August the party visited Corrach Uachdar, about eight miles up Glen Lochy. On this hill *Cystopteris montana* used to grow abundantly, but this year not a frond was met with. On 8th August they ascended Ben Lawers, as far as the rocks above Loch-na-Ghat. During the excursion they examined particularly *Parnassia palustris* in its various stages of flowering. Observations were made also on protandrous plants, such as *Digitalis*, *Hypericum*, and *Polygonum*, and on protogynous plants, such as *Plantago*. On 9th August the party visited Larig-an-Lochan, Ben Lassie, and Ben Lawers, ascending the latter by the western side. On the rocks at the former place they expected to have gathered *Woodsia hyperborea*, where it used to occur in considerable quantity; they were unable, however, to detect it. On Wednesday, 10th August, they proceeded to Cheeri, a farmhouse about six miles up Glen Lochy, at the foot of Mael Ghyrdy, a mountain over 3400 feet, which was ascended to the summit and descended on the opposite side for a considerable distance, to examine the rocks facing Glen Lyon. On these rocks were collected *Cystopteris montana* and *Bartsia alpina*, which were met with in great abundance, besides many other commoner alpine plants. The adventures of this week's excursion led to the formation, at Killin, of a Scottish Naturalists' Alpine Club, to consist of naturalists who are in the habit of visiting alpine districts of Scotland for the study of science, and who have proved themselves to be pleasant *compagnons de voyage*.—"On Some New and Rare Mosses collected on Ben Lawers." By Dr. James Stirton. This was a continuation of a paper read last Session, and printed in the 'Transactions,' vol. x. p. 426.—"On the Varieties of *Hieracium stoloniflorum* of Waldst. and Kit. at Different Seasons." By Professor Balfour. This plant, described in the Society's 'Transactions,' vol. x. pp. 316–317, has been found by Mr. Sadler to present peculiar forms at different periods of the year. These forms are so remarkable that they appear to be worthy of record. They are not only important in themselves, but they are valuable as indicating the necessity of caution in determining species of *Hieracium* by an examination of the plant at one season only. By so doing we may be led into difficulties, and may even describe as distinct species what are mere variations in the growth of the same plant. In the month of June we have two forms of the plant. In No. 1 there is a thickish root giving off slender rootlets chiefly on one side, the crown of the root producing a few leaves (3–5) which are obovate-spathulate; from the crown also arises a very hairy, short, floral axis, about an inch long, which bifurcates, each branch elongating and bearing a few narrow leaves which diminish in size as we ascend. The branches sometimes terminate at the end in two smaller axes, each bearing a very small and contracted head of flowers. At other times the ascending axis divides in a dichotomous manner once or twice before producing capitula. The whole habit of the plant is peculiar on account of the small number of leaves, and the very much elongated floral axis—sometimes being 12–14 inches in length, and the small capitula. It looks starved, and may perhaps be the form called *bifurcum* by Frölich, or the *collino-Pilosella* of Fries, Novitiae, or the *collinum* of his Monograph on *Hieracium*, p. 5. In the other June form (No. 2) we meet with the long slender scapes, the small capitula, and the marked bifurcation, as in form No. 1; but there are produced numerous stolons, bearing many obovate-spathulate leaves. In this there are often several (two or more) primary scapes arising from the crown of the root. In this case we have an approach to the *Pilosella* form. This may be the *H. pedunculatum* of Wallroth, described as a singular prostrate plant. In the end of July and beginning of August we have form No. 3, in which the stolons have multiplied largely, and most of them end in corymbose clusters of capitula, which are much larger than in the first two forms. In this case there are no elongated, naked, or few-flowered scapes, but stolons bearing heads of flowers. The rhizome is creeping and stoloniferous, and the leaves are obovate-obtuse. Some of the stolons, however, do not flower at this stage, but strike root at their extremities, and form independent plants, a few of which flower in October and November, forming No. 4; others do not flower till the succeeding June, Nos. 1 and 2. This is a near approach to the *H. stoloniflorum* of Fries, in his Monograph of *Hieracium*, and it may be the *flagillare* of Willdenow. In the month of October, we meet with form No. 4. In this we have the condition described in the 'Transactions,' or the *stoloniflorum* of Fries. Here we have a cluster of obovate-obtuse leaves at the base, with a single scape often monophyllous, rising directly upwards, and bearing few heads, generally two, of a larger size than those of the other forms mentioned; and from the crown of the root proceed several young stolons, bearing numerous leaves, but no flowers. These stolons are those which flower the following year, as seen in No. 3. Mr. Sadler made some remarks on specimens of a form of *Centaurea nigra*, which he collected in September last on the Achil Hills, near Forgandenny, in Perthshire. It is the *C. pratensis* of French authors. A note was read from Mr. I. F. Duthie, regarding two forms of *Pyrus* in Arran. Dr. Boswell Syme considers them both as *P. scandica*, the one with the lower pinnæ separated being *P. scandica*, var. *pinnatifida*. Mr. Duthie stated that he tasted the fruit of the Arran *P. pinnatifida*, and found it quite sweet; whereas, according to Fries, the fruit of *P. fennica* is acid. Professor Dickson exhibited a plant of the Chinese Primrose having stamens and style of the same length (short), although in this species, as in the other dimorphic Primroses, they are usually of different lengths. This form is interesting, inasmuch as in an abnormal Cowslip, described some years ago by Mr. John Scott, the stamens and style, although of the same length, were both long. Colonel Drummond recorded the finding of *Butomus umbellatus* in large quantity on the banks of the Tay, near Seggieden, Perthshire.

Literary and Philosophical Society of Manchester.—*Nov. 7th*, 1870.—J. Baxendell, Esq., in the chair; "On the Hawthorns of the Manchester Flora," by C. Bailey. Characters were given of the three segregates of *C. Oxyacantha*, L., found in Great Britain.—The prevailing form in the district is the *C. monogyna*, Jacq.; it is that of which all the quickset hedges are made, and is said to flower a fortnight later than the third subspecies. The second form, the *C. kyrtostyla* of Fingerhuth, I collected on the 25th May, 1867, in Botany Bay Wood (Mersey Province, County No. 59 of Watson), on the path from Barton Moss to Worsley, where it forms several handsome trees. It attracted my attention at once by the large proportion of its flowers which possessed two styles, and by the comparative large size of the corymbs; its fruit I have not been able to examine, as the ground in which it occurs is preserved by the Earl of Ellesmere, and is accessible only by a written order. The addition of the third subspecies, *C. oxyacanthoides*, Thuill., to our flora, is due to Mr. John Hardy, who detected a single bush of it on the 27th August last, at Marple (Mersey Province, County No. 58), on the right-hand side of the high-road from the railway station, a little past the uppermost lock of the canal. The leaves of this plant are of considerable size, being about twice as large as those of a plant in my herbarium from Hampstead, collected by Dr. J. Boswell Syme, and excepting that the leaves are glabrous, the Marple plant appears to agree with the variety β *majus*, Hobkirk. The most obvious character for determining this subspecies in the absence of the flower or fruit, is the arrangement of nerves in the leaves, which are arcuate, with the extremities turned towards the midrib; in the two first-named forms the nerves are arcuate in the opposite direction, *i.e.* they are turned outwards. There is one peculiarity in the venation of the Hawthorns, which is invariably overlooked by the draughtsman and engraver, viz. the direction of the secondary nerves, which proceed from the midrib to the base of each sinus; such an arrangement is very rare, being found only in some other species of *Cratægus*, as *C. Azarolus*, etc., in species of *Fagus*, and in a few other plants. Mr. Spencer H. Bickham, jun., reported the occurrence of *Myosurus minimus*, L., in plenty at Vale Royal, near Northwich, which species he believed had never previously been noticed in the neighbourhood.

Nov. 29th, 1870.—R. Angus Smith, Ph.D., F.R.S., Vice-President, in the chair. "Notes on the Botany of Mere, Cheshire," by George E. Hunt. The border of Mere Mere has for long been a locality famous to the botanists round Manchester, and I was led, in 1864, to commence a systematic and continuous exploration of Mere, with the view of discovering as many of the recorded Mosses as might still exist there. It may be of service to other bryologists in the district to mention those which grow there at the present date, and also the nature of soil they prefer. *Physcomitrium sphæricum*, found by Wilson in 1834, and recorded in the Bry. Brit. A careful search, in 1864, led to the re-discovery of this species in very minute quantity. In 1865 it was still more sparing (not above a dozen capsules). 1866 was so exceedingly wet a season that the plant could not have come up at all. 1867, it again occurred very sparingly. 1868, it was plentiful, but destroyed by the autumn rains before much of the fruit had ripened. 1869, again frequent, and would have been plentiful but the autumn rains again destroyed it whilst the fruit was even more immature than in the preceding year. 1870, very plentiful, and abundance of it has come to maturity. This Moss *always* grows on dried mud. *Phascum serratum* β is frequent every autumn on clay and sandy banks at Mere; it occurs quite frequently in cornfields at Bowdon, in damp seasons, coming up a few weeks after the corn has been cut. In cornfields at Bowdon its companions are *P. muticum*, *P. alternifolium*, and *Pottia truncata*, and very rarely *Trichodon cylindricus*—the latter never fruits in this district. *Phascum nitidum*, frequent every autumn at Mere on clay and sandy banks; it occurs elsewhere about Bowdon on newly-cut ditch banks. *P. rostellatum*, on banks at Mere, with the two previous species, but much more sparingly. It has also been found in Sussex by Mr. Mitten, and was collected there again last year by Mr. Davies. It is one of the rarest of all the British Mosses. *P. sessile*, very rare at Mere. I collected it in the autumn of 1869, and again in November, 1870, intermixed very sparingly among *P. serratum*, from which it is difficult to separate it except with the aid of the microscope. With this it can be at once distinguished from that species by its longer, more rigid, almost entire leaves, with a very wide nerve. *P. serratum* has no nerve, and the leaves are spinulosely serrated. *P. sessile* was gathered in Sussex many years since, but I have not heard of its recent discovery either there or elsewhere. It is one of the rarest British Mosses. *P. patens*, on dried mud, almost every season, intermixed with *Physcomitrium sphæricum*, and usually much more plentiful than that species. This Moss comes up in autumn in the Ashley district of Bowdon, although very sparingly, wherever an open drain has been cut in spring. It also springs up about Bollington, under the same circumstances. *Phascum cuspidatum*. I have not yet found this *at* Mere, but it comes up on banks on the Chester Road between Bowdon and Bucklow Hill, when they have been newly made up, or plastered with mud from the road. *Leskia polycarpa* fruits freely about the roots of trees on the borders of Mere, both in autumn and spring. *Hypnum riparium*, a very neat variety of this Moss, fruits in abundance in August and April, on clay banks and at the roots of trees at Mere. *Riccia fluitans* and *R. crystallina* are both frequent on dried mud at Mere, with *Phascum patens*, etc., and both species fruit freely there. Numerous interesting flowering plants are also found, viz. *Elatine hexandra*, *Limosella aquatica*, *Peplis Portula*, *Polygonum minus*, *Littorella lacustris*,—all plentiful on mud. *Carex vesicaria*, fringing the woods at the edge of the Mere. *Scirpus acicularis*, in vast quantity in sandy places. *Carex Œderi*, in stony and grassy places. This is the true *Œderi*, and very rare ; I have only seen it elsewhere on the sands on the south side of Southport, where it is very abundant and luxuriant. It appears quite distinct as a species from *C. flava* (including *C. lepidocarpa*), with which it is often placed as a variety. *Centunculus minimus*, frequent some seasons in the open pastures on the borders of the Mere. *Mentha sativa*, in ditches by the roadsides between Bucklow Hill and Mere Mere. *Rubus Balfourianus* and *R. pallidus*, in thickets by the Mere. *Polygonum mite* has been reported from Mere, but after searching without success for it for several seasons, I can only suppose that some of the more luxuriant forms of *P. minus*, frequent there, have been mistaken for it. The seeds of *P. minus*, which are *shining* black, and only half the size of those of *P. mite*, afford the only safe distinction.—Mr. Hardy remarked that so long ago as 1828, Mr. William Wilson, of Warrington, sent *P. mite* from a Cheshire locality, under the erroneous name of *P. minus*, to the late Sir William Jackson Hooker, in whose herbarium at Kew the specimens still are. Mr. Hewett C. Watson, the author of the 'Cybele Britannica,' mentions these specimens, and does not express any doubt of their being the *P. mite*, of Schrank. Mr. Hardy found the plant at Mere in 1860, and sent specimens to the Botanical Exchange Club, then located at Thirsk ; and Mr. J. G. Baker, the Curator, in his report for the next year, mentions these specimens as new to the Mersey province. Mr. Hardy stated his belief in Mr. Watson's opinion, that *P. mite* was much more difficult to distinguish from *P. Persicaria* than from *P. minus ;* and he had not the least doubt, notwithstanding Mr. Hunt's objection, that, now special attention had been called to the species in question, it would be proved, in the course of another season, to be an inhabitant not only of the Mere district, but common in other stations included in the Manchester flora.

Botanical News.

After the long service of forty-two years, Mr. J. J. Bennett has resigned the keepership of the botanical collections at the British Museum. When, in 1828, Mr. Bennett became Mr. Robert Brown's assistant, the herbarium of Sir J. Banks had only just become national property, and Mr. Brown had been appointed its first keeper. Till the death of the latter, in 1858, Mr. Bennett worked laboriously at the naming and arrangement of the constantly increasing national collection. For the last eleven years, as head of the botanical department, Mr. Bennett's uniform courtesy and kindness, and the readiness with which he has always placed his great stores of information at the disposal of all who applied to him have been conspicuous and fully appreciated. How varied and extensive that knowledge is, is known to too few, though the exhaustive notes of the 'Plantæ Javanicæ Rariores' are some published evidence. It is with great regret that we chronicle a loss to the Museum which can scarcely be replaced, but we trust that freedom from official cares and duties may long preserve among us one who is esteemed by all who know him.

The Perthshire Society of Natural Science have in contemplation the establishment of a quarterly magazine, the proposed title of which is 'The Scottish Naturalist and Journal of the Perthshire Society of Natural Science,' to be specially devoted to the record of observations and discoveries made in the North. As the subscription is only 3*s*. 4*d*. annually (including postage), we hope that many will send their names to Mr. A. T. Scott, Clydesdale Bank, Perth, the Hon. Secretary. The first number will appear this January.

The first volume of the 'Transactions of the Newbury District Field Club' is in preparation, and will appear about March next. It will contain a list of Berkshire plants by Mr. Britten.

We hear that the directorship of the Calcutta Botanic Gardens, vacant since the lamented death of Dr. T. Anderson, is likely to be filled by the appointment of Dr. King.

Among some MSS. of Pulteney's, lately acquired by the Linnean Society, is a Flora (pp. 124) of the neighbourhood of Loughborough, Leicestershire. It has the date 1749, and must have been one of Pulteney's earliest efforts. It contains a good many coloured drawings of Lichens and Fungi. A list of the rare plants found in this neighbourhood was afterwards contributed by Pulteney to Nichols's 'History of Leicestershire' (1790).

Mr. H. C. Watson has published a complete list, with critical notes of the Phanerogams and Ferns of the Azorean Isles, in Mr. Godman's 'Natural History of the Azores.' We shall notice at length this interesting catalogue in our next number.

We are glad to hear that the authorities of the Post-Office have under consideration a revision of the rules at present in force with reference to the sample and pattern post. The recent regulations restricting the articles which may be sent by this method to *boná-fide* trade samples have proved very vexatious to botanists, as well indeed as to all classes of the community, and considerable public dissatisfaction has been expressed. There is, however, a good chance of a restitution of the old arrangements, if not the adoption of some of even greater convenience.

Messrs. Berkeley and Broome continue in the last number of the 'Annals of Natural History,' their notices of British Fungi. Eighty species are enumerated (all species of *Agaricus*), most of which are recent additions to the British flora, and several of which were first published in this Journal. There appear to be seven species new to science described, viz. *A. (Lepiota) netulæspora*, *A. (Lepiota) Ferreii*, *A. (Mycena) sacchariferus*, *A. (Naucosia) semiflexus*, *A. (Hypholæna) leucotephrus*, *A. (Psilocybe) aquarius*, *A. (Psathyrella) empyreumaticus.*

Our readers will not fail to observe the alteration in the aspect of our pages. By the adoption of a 'solid' mode of printing, and by lessening the margin, a gain in the amount of letterpress equal to more than eleven of our old pages has been effected in each number without altering the size of the page or increasing the bulk of the Journal. We have been encouraged to make these changes by the increase in the amount of material which comes into our hands; and, in the hope that our circulation will equally extend itself, no increase has been made in the subscription. In return for these advantages, and in consideration of the additional expenses of a greatly-enlarged magazine, we hope our correspondents will co-operate with us, and we earnestly request them to endeavour to spread a knowledge of the existence of this Journal amongst their botanical friends.

An impression has been prevalent among purely British botanists that their special department is neglected in our pages. A perusal of the volume just completed will show how unfounded is this notion. While it has been, and still is, our object to exclude no department of botanical science, it is desired to give especial attention to our own flora; and no communication which adds any fact, however slight, to existing knowledge of British plants is refused. We invite, therefore, that section of our subscribers on which we chiefly depend for support to contribute to our pages. With the exception of detailed descriptions of botanical excursions in well-known districts, there is scarcely any subject bearing on the vegetation of Great Britain and Ireland which will not be most acceptable.

COMMUNICATIONS have been received from:—J. R. Jackson, Rev. A. Ley, Prof. Thiselton Dyer, Dr. W. R. M'Nab, J. Sadler, J. Britten, C. Bailey, Prof. A. H. Church, W. Phillips, R. Holland, W. A. Leighton, H. Reeks, T. Allin, W. Mitten, W. G. Smith, Hon. J. L. Warren, L. H. Grindon, R. Tucker, etc.

Original Articles.

ON *POLYGONUM NODOSUM.*

By W. T. Thiselton Dyer, B.A., B.Sc,

and

Henry Trimen, M.B., F.L.S.

The two species of *Polygonum*, *P. Persicaria*, L., and *P. lapathifolium*, L., are conspicuously represented in the late summer vegetation of broken and uncared-for land about London, by several easily recognized forms. Like the *Chenopodiums* and *Atriplexes* that grow with them, they flourish on ground which has been liberally cultivated till laid out for building, but which has not yet become hard and consolidated by the alternate action of rain-wash and sun-baking. There are always plenty of spots in the advancing outskirts of the suburbs where these conditions are to be found, and it is seldom necessary to look far for a place to study *Polygonums*.

Quite the commonest of the London forms, though perhaps not elsewhere so frequent, are those which are described in English books under the names of *P. nodosum* or *P. laxum*. (See Fl. Middlesex, pp. 243, 244.) They are not perhaps collectively separable from typical *P. lapathifolium*, by very satisfactory characters, yet they belong to a type which has been well figured by Curtis, Reichenbach, and Babington, and is thoroughly familiar to Metropolitan botanists,—having a certain characteristic *facies* which serves the ends of recognition, as well perhaps as anything more definite. Typical *P. lapathifolium* has a somewhat diffuse mode of growth, and dense cylindrical and remote racemes, with perianths and unspotted stems of a dull apple-green colour. The *P. nodosum* of authors, on the other hand, is rather erect than diffuse, and has stems usually spotted; racemes collected into a more or less distinct pyramidal panicle, laxer, and narrower in proportion to their length; the perianths also are reddish and smaller, and the fruit is, roughly speaking, half the size of that of *P. lapathifolium*. It was well known to the ante-Linnæan botanists; the *Persicaria latifolia geniculata caulibus maculatis*, D. Rand., which was found "passim circa Londinum" (Ray, Syn. iii. 145), belongs to it; and two forms were distinguished by Buddle, and are preserved in his herbarium (Herb. Sloane, vol. cxvii. fol. 20). It was described and figured by Curtis under the name of *P. Pensylvanicum* var. *caule maculato* (Flor. Lond. f. 1), by Reichenbach as *P. nodosum*, Pers. (Iconog. Bot. Cent. V. ic. 689), and finally by Babington as *P. laxum*, Reich. (E. B. S. 2822). In each case it seems extremely probable that the plant has been wrongly identified. Curtis probably followed Hudson in referring these glandular *Polygonums* to *P. Pensylvanicum*, L., with which, however, they have little connection. It is less easy to decide its claims to be considered the *P. nodosum* of Persoon. As, however, the description given by that author of his plant is very short, the whole may be quoted for comparison:—

* *Nodosum*, caule elongato maculato ad geniculas nodoso, vaginis nudis, fol. ovato-lanceolatis, spica ramosa. Hab. In humidis, in ruderatis rarius. Caul. 3-pedalis, unc. 1 crassus. Fol. margine et ad petiolos scabra. An a Persicaria specie diversum? (Syn. Plant. vol. i. p. 440.)

It is marked with an asterisk, which indicates its being looked upon as an obscure plant. Taking into consideration Persoon's inclination* to include it under *P. Persicaria*, it seems reasonable to conclude that it was not glandular, and if so, the naked stipules are the only character which leans towards an identification with *P. lapathifolium*, and that is by no means an absolute one. In all other respects the description agrees better with a large state of Grenier and Godron's variety *elatum* of *P. Persicaria*, especially as a preference for damp situations is indicated. This is the view adopted by Syme (Eng. Bot. vol. viii. p. 75); Meisner, in DC. Prod. vol. xiv. p. 118, also places it in the section † with non-glandular peduncles, with *P. Persicaria*, and away from *P. lapathifolium*.

The *P. laxum* of Reichenbach is described and figured by him (Iconog. Bot. ic. 685, Cent. V. p. 36) as a non-glandular plant, with the stipules very slightly ciliated, but the peduncles and pedicels strigose-hispid. The styles are shown in the figure to be connected halfway up as in *P. Persicaria*, and not as in *P. lapathifolium*, nearly free. Bearing in mind Syme's remark that *P. nodosum*, auct., has very much the aspect of the var. *elatum* of *P. Persicaria*, it will probably be admitted that, as between the two plants, the arrangement of the styles and the absence of glands carry *P. laxum*, Reich., rather towards *P. Persicaria* than towards *P. lapathifolium*.

Since, then, the descriptions neither of *P. nodosum*, Pers., nor of *P. laxum*, Reich., clearly characterize the *P. nodosum* of authors, we are forced, if we regard it as of specific or sub-specific rank, to search for another name; and though by no means satisfactory, Gray's *Persicaria maculata* appears to be the earliest post-Linnæan one unquestionably applying to the plant.‡

Reichenbach, in his description of this plant (*l. c.*), speaks of it as "vario modo confusa atque cum aliis concussa." And if additional illustration of this remark were needed, it could be supplied in abundance from English books. Babington, in the first four editions of his 'Manual,' quotes Reichenbach's *P. nodosum* as a variety of *P. lapathifolium*, quite connected by intermediate forms. As he named the plant which he described and figured in E. B. S. 2822 (clearly identical with Reichenbach's *nodosum*), *laxum*, Reich., he was compelled, contrary to the fact, to represent Reichenbach's *laxum* as a glandular plant with an arrangement of styles resembling that of *P. lapathifolium* rather than *P. Persicaria*. In the fifth edition "*P. nodosum*, Pers.," disappears as a variety of *P. lapathifolium*, to take the place of "*P. laxum*, R.," which is reduced to a synonym of it. Yet there is no reference to Reichenbach's characteristic figure of "*P. nodosum*," but his figure of *P. laxum*, which contradicts the description, is quoted instead. The same arrangement is maintained in the sixth edition. Bentham looks upon *P. lapathifolium* as probably a mere variety of *P. Persicaria*, only distinguished by the "pedicels and perianths being dotted with small prominent glands." This might very well be the case if the fig. 868, in the illustrated edition of the 'Handbook of the British Flora' be accepted as characteristic of *P. Persicaria*. It has, however, all the habit of *P. maculatum*, and the styles are represented unconnected and deflexed as in *P. lapathifolium*.

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* Fries remarks (Mant. ii. p. 25), "Pers. a *lapathifolio* separans, *P. Persicariæ* subjungere vellet."

† Pedunculi eglandulosi, læves, glabri vel pubescentes.

‡ In the Kew Herbarium are examples with the name *P. paniculatum*, Andr., on the authority of Besser. This good descriptive name, looking at the arrangement of the inflorescence, seems never to have been published, and has besides been appropriated to a Java species by Blume.

About London *P. Persicaria*, L., presents itself in the typical form, well figured in a new plate by Syme in E. B. MCCXXXVII., and by Reichenbach (Iconog. Bot. ic. 684). This has a stem rarely spotted, with rather loosely arranged divaricating branches and stout, rather short (compared with *P. maculatum*), blunt, oblong or cylindrical, remote racemes. The plant figured by Curtis (Flor. Lond. f. 1) is probably a luxuriant state of the type. The old figure of *P. Persicaria*, E. B. 756, now used by Syme to illustrate the variety *elatum*, is one from which all definite characters seem to have evaporated, and is almost valueless. The authentic specimens of *P. Persicaria* in Sowerby's herbarium are really *P. maculatum*, and it is by no means impossible that this plant was *in part* copied by the artist, though the details are from *P. Persicaria*.

A much rarer form of this species occurs occasionally in moist cultivated ground. It may be distinguished from the type by its more succulent and swollen stem, ascending and not divaricate branches, and racemes not cylindrical, but longer and attenuated upwards, contracted when young into a panicle. The foliage also is somewhat weaker in texture, and of a livelier green. This is the *P. biforme* of Wahlenberg (Suec. n. 437) and of Fries (Mant. ii. p. 28), who quotes Curtis's figure, in which he is perhaps right,* and also Reichenbach's, which belongs to the more typical form. Authentic specimens of *P. biforme*, from Fries, in the Kew Herbarium, it is noticeable have ochreæ without cilia, though this does not accord with the description. *P. Persicaria*, *β. elatum* (Gren. et Godr. Fl. de Fr. vol. iii. p. 48), is another synonym, and it has already been shown to be probably the true *P. nodosum* of Persoon. *P. laxum*, Reich., which seems to have nothing really to do with *P. maculatum*, may be also capable of inclusion here. Some writers (Boreau, Fl. du Cent. de la Fr. ed. 3, t. ii. p. 557, Gren. et Godr. l. c. p. 49) regard *P. laxum*, Reich., as a hybrid between *P. Hydropiper* and *P. maculatum*. If so, it is remarkable that a glandless plant should be the offspring of two glandular parents. Fries says of this plant "transitus ad *Mite*," (Mant. vol. ii. p. 26).† A curious variety referable to the typical form of *P. Persicaria*, but which may be really a hybrid, has the peduncles slightly glandular hispid. It has been distributed by Mr. Watson from Esher, and has been noticed at Kilburn and Haverstock Hill. There are also specimens from Essex in E. Forster's herbarium.

It will be convenient to give the characters and synonymy in a collected form.‡

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* In Fl. Midd. p. 244, we have also quoted it, but our notion of this form was at that time more comprehensive than now.

† Reichenbach, in his description in the 'Iconographia Botanica,' was not disposed to accept the suggestion of hybridity, remarking "nimis enim prodigiosa mihi videtur hybriditas hodierna." However, in the 'Flora Excursoria,' 3696, he gives *Hydropiperi-nodosum* as a synonym, with the explanation "Inflorescentia densa gracilis floresque parvi rosei *P. nodosi*, folia contra et ochreæ *P. Hydropiperis*."

‡ Linnæus seems to have founded his *P. lapathifolium* on a species of Tournefort's, and the only locality he gives is "Gallia"; as he describes the plant as "floribus . . . semidigynis," it is somewhat doubtful what he really meant. The Linnean Herbarium only confuses matters, the specimen named "*lapathifolium*" being a widely

P. LAPATHIFOLIUM, L. Sp. Plant. ed. 1. vol. i. p. 360.

Peduncles and perianths with yellowish glands; styles 2, free nearly to the base.

P. pensylvanicum, Huds. ed. 1. p. 148; Curt. Fl. Lond. fasc. 1; With. ed. 2. vol. i. p. 411 (non Linn.).

P. pallidum, With. ed. 3. vol. ii. p. 381.

Subsp. 1. *lapathifolium verum.*

Racemes remote; perianths shorter than the nut.

Persicaria mitis major fol. pallidioribus, Bobarti, Ray, Syn. ed. 2. p. 58.

P. lapathifolia, Gray, Nat. Arr. vol. ii. p. 269.

Polygonum lapathifolium, L., Bab. Man. ed. 5 and 6.

P. lapathifolium, var. α. *genuinum*, Syme, E. B. vol. viii. p. 76.

Fig. Curt. Fl. Lond. fasc. 1; E. B. 1382, repr. in Syme, E. B. vol. viii. t. 739.

Exs. Herb. Fl. Ingric. cent. iv. n. 540 and 5406.

Loc. Frequent. (China, Sir G. Staunton, Herb. Mus. Brit.)

Var. β. *rubrum*, Gray, Nat. Arr. vol. ii. p. 270.—Perianths red.

P. pensylvanicum, var. caule et flor. rubris, Curt. l. c.

Sunninghill, Berks. (Herb. Banks), N. London, S. Kensington.

Subsp. 2. *maculatum* (*Persicaria maculata*, Gray).

Racemes approximated, forming a thyrsus; perianths larger than the nut, which is half the size of that of subsp. 1. Stem often spotted and swollen at the nodes.

Persicaria latifolia, geniculata, caulibus maculatis, D. Rand; R. Syn. ed. 3. p. 145.

P. foliis Salicis albæ vulg. et *P. mitis maculosa repens subtus incanis ad genicula florens*, Buddle, Herb. (Herb. Sloane cxvii.) fol. 20.

Polygonum pensylvanicum, var. *caule maculato*, Curt. l. c.

P. pensylvanicum, var. 3, *petecticale*, Stokes in With. ed. 2. vol. i. p. 412.

Persicaria maculata, Gray, l. c. p. 270.

Polygonum nodosum, Reich. Ic. Bot. 589; Bab. Man. ed. 5 and 6, Fl. Midd. p. 243, and Auct. plur. (non Pers.)

P. laxum, Bab. in E. B. S. 2822 and Man. ed. 1–4 (non Reich.).

P. lapathifolium, var. β. *nodosum*, Bab. Man. ed. 1–4; Syme, E. B. vol. viii. p. 76; Hook. Stud. Fl. p. 308.

Var. α. *gracile.* Racemes slender.

Fig. Reich. Ic. Bot. 689; E. B. Supp. 2822 (left-hand fig.).

Exs. Reich. Fl. Germ. Exs. n. 479; Billot, Fl. Gall. et Germ. Exs. 1062 ("*P. lapathifolium*, L.," peduncles sub-eglandulose), and 1062 *bis*; Herb. Fl. Ingric. n. 539.

Loc. North London. Sunninghill, Berks. (Herb. Banks), Henfield, Sussex (Herb. Borrer), Woodford, Essex (Herb. Forst.), Monmouth (Bab.), Aix-en-Savoie (Herb. Gay), Chalons-sur-Seine (Billot, Exs.), Dresden (Reich. Exs.),

different (Indian?) species. The figure quoted by Linn. is Lob. Ic. 315, a very fair representation of *P. maculatum* (*P. nodosum*, auct.). That he confounded this and *P. Persicaria* is obvious, from his describing the latter as "floribus digynis," thus reversing the characters of the plants as now understood. It is, however, most undesirable to alter these long-established names.

Lalek, Lebanon (Herb. Kew.), Constantine (Herb. Hook.), Afghanistan (Herb. Griff.).

Var. *β. densum.* Racemes oblong.

Fig. Curt. Fl. Lond. fasc. 1; E. B. S. 2822 (right-hand fig.).

Loc. N. London. Woodford, Essex (Herb. Forst.), Tyrol (Hausmann in Herb. Mus. Brit.), Russia (Turczaninow in Herb. Kew.).

P. PERSICARIA, L. Sp. Plant. ed. 1. vol. i. p. 361.

Peduncles wholly and perianths nearly eglandular; styles connected halfway up.

Subsp. 1. *Persicaria verum.*

Branches spreading, divaricate; racemes remote, short, obtuse, cylindrical.

Persicaria maculosa, Gray, l. c. p. 269.

Polygonum Persicaria, var. *a. genuinum*, Syme, E. B. vol. viii. p. 74.

Fig. Reich. Ic. Bot. 684; Syme, E. B. vol. viii. t. 737. (E. B. 756, repr. in Syme, E. B. vol. viii. p. 738, and Curt. F. L. fasc. 1, probably represent large states.)

Exs. Herb. Fl. Ingric. n. 541; Reich. Fl. Germ. Exs. n. 773 (large state).

Loc. Abundant.

Var. *β. album.*—Perianths greenish-white.

Loc. Kilburn.

Subsp. 2. *nodosum*, Pers. (*sp.*)

Branches erect; racemes slender, rather lax attenuated upwards, agglomerated into a thyrsus when young. Stem enlarged at the nodes.

P. nodosum, Pers. Syn. p. 1. p. 440 (non Reich. Bab. nec Auct. plur.).

P. nodosum, Pers., Meisner in DC. Prod. vol. xiv. p. 118 (excl. synon.).

P. biforme, Wahlenb. Fl. Suec. vol. i. p. 242; Fries, Mant. vol. ii. p. 28.

P. laxum, Reich. Fl. Excurs. n. 3696 (non Bab.).

P. Persicaria, var. *β. elatum*, Gren. et Godr. Fl. de France, vol. iii. p. 48; Syme, E. B. vol. viii. p. 74.

P. Persicaria, var. *elatius*, Meisner, l. c.

Fig. Reich. Ic. Bot. 685 (probably).

Exs. Billot, l. c. n. 1063 ("*P. Persicaria*, L."); Van Heurck et Martinis, Pl. Critiques de Belg. fasc. iv. n. 185.

Loc. N. London; Halstead, etc., Essex (Herb. Forst.); Henfield (Herb. Borr.); Battersea Fields, Surrey (Syme in E. B.); Besançon (Billot, Exs.); Chambéry (Herb. Gay); S. Denis, Hainault (Van Heurck, Exs.).

Typical *P. Persicaria* and both subspecies of *P. lapathifolium*, equally admit of forms found on barren soil, more or less prostrate and depauperate, which have the leaves clothed beneath with short dense white hairs (varieties called *incanum*), and the racemes often subglobose or ovate. In their normal state these plants will generally be found easily distinguishable. It must, however, be admitted, that while what is held here to be the true *P. nodosum* of Persoon, graduates into the typical condition of *P. Persicaria*, it is itself on the other hand often difficult to distinguish from subeglandular states of *P. maculatum*. Such a difficulty no botanist is unfamiliar with. The names of critical plants in books are often nothing more than halting-points in a long series of connected forms, arbitrary perhaps, yet not without their value in marking out the route. It seems as unphilosophical to ignore anything but the bounding terms, as it would be uncritical to think nothing of importance in a journey through an interesting country, but the starting-point and the destination.

ON THE SO-CALLED "OLIVES" (*CANARII* spp.) OF SOUTHERN CHINA.

By H. F. Hance, Ph.D., etc.

In his excellent 'Notes on Chinese Materia Medica,' Mr. D. Hanbury refers to certain fruits known to foreigners resident in this country by the name of *Chinese Olives;* and he suggests the desirableness of more precise information being obtained in regard to them. Of those which Mr. Hanbury mentions as sold at Foochow and Shanghae, I have no knowledge at all; and the following observations relate exclusively to the fruit vended everywhere in the south of Kwang-tung province, of which there are two kinds,—the *U-lam*, or Black, and the *Pak-lam* or White Olive,—produced respectively by *Canarium Pimela*, Konig, and *C. album*, Ræuschel.

On these two plants and a third Cochinchinese species, occurring also throughout the Moluccas, Loureiro founded his genus *Pimela*,[*] which, by the consent of all subsequent botanists, was merged in *Canarium*, until again distinguished by the late Professor Blume, who considered it a "genus optimo jure dignum esse quod restituatur.[†] The only characters, however, by which it differs from *C. commune* and its allies consist in the thin foliaceous not fleshy cotyledons, and in the insertion of the stamens at the base instead of the margin of the disk; distinctive marks which Dr. Hooker very naturally regards as of merely sectional value.[‡]

Both the white and black Olives are a good deal grown around Whampoa, whilst I have seen none in the immediate neighbourhood of Canton, or in Hongkong, and their cultivation is therefore apparently local: I can gain no intelligence of their occurrence in a wild state. They are trees from twenty to thirty feet high, with a whitish trunk, and a close round crown of foliage,[§] which in hot sunny days exhales a grateful balsamic odour; in which respect, as well as in general aspect, they resemble our common Walnut. The two species, though perfectly distinct, are singularly alike,—so much so, indeed, that even now, after having made them an object of special study, I am quite unable, in the absence of fruit, to tell one from the other at a few feet distance. Blume gives the following differential characters:—

[*] Fl. Cochinch. ed. Willd. vol. ii. p. 494.

[†] Mus. Bot. Lugd.-Bat. vol. i. p. 220.

[‡] Gen. Plant. vol. i. 325. The *flores longe pedicellati*, assigned as a character in this work, do not occur in *C. album*.

[§] The name by which these trees are properly known to foreigners, and their dense tufted foliage, recall to mind the Homeric—

῞Ηδε δ᾽ ἐπὶ κρατὸς λιμένος τανύφυλλος ᾿Ελαίη.—Odyss. xiii. 346.

Canarium Pimela; foliolis 9–11 oblongis acutis inæquilateris glabris, racemis lateralibus simplicibus.

Canarium album; foliolis 11–13 ovato-lanceolatis supra glabris subtus scabris, racemis confertis subterminalibus.

These are, however, neither quite accurate, nor by any means sufficient for the discrimination of the two species; and, in their lieu, I propose the following, drawn up after a careful comparative examination of living specimens of each tree.

Canarium Pimela; petiolo petiolulisque viridibus, foliolis 4–5-jugis cum impari oblongo-lanceolatis 3–6 poll. longis 2½–3½ poll. latis venulis elevato-reticulatis, racemis plus minus compositis, drupis pedicellis clavato-incrassatis 5–7 lin. longis suffultis fusiformibus utrinque obtusis subtrigonis 20 lin. longis immaturis glauco-viridibus maturis purpureo-nigris lævibus, putamine obtuse fusiformi lævi.*

Canarium album; petiolo petiolulisque alutaceis, foliolis 5–6-jugis cum impari oblongo-lanceolatis 2½–4 poll. longis 12–16 lin. latis venulis supra non prominulo-reticulatis, racemis simplicibus, drupis sessilibus ovoideis 15 lin. longis immaturis flavido-viridibus maturis sordide flavidis valde rugosis, putamine acute fusiformi ruguloso.

I should remark that, when dried, the leaves of both species have the veinlets prominent, but the network is much closer and finer in those of the white Olive.

As regards the mode of using these fruits, the following is the information I have myself gathered, from personal observation and inquiry of the natives:—The white Olive is either eaten fresh, in which state its strongly resinous flavour renders it disagreeable to the European palate, or is placed, when quite ripe, in tubs filled with salt, stirred about continually, and, after the lapse of a day taken out and dried. In this state it is hawked about in great abundance, and tastes much as the European Olive might be expected to do, if removed from the brine in which it is kept and allowed to dry, with an appreciable *soupçon* of turpentine superadded. I have been told it is regarded as a preventive of sea-sickness. The black Olive is never eaten raw, but only after having been steeped for a few moments in boiling water. Thus prepared (and packed in jars, with the addition of a little salt, when desired to be preserved), it is of a fine purplish-red colour, like well-made fresh pickled cabbage, and has some resemblance in taste to freshly pickled mango, a flavour to me not unpleasant, but *de gustibus non est disputandum.* This fruit is held in much higher esteem than the other, and it is usual to keep a strict watch over it as it ripens to prevent depredation. I have seen a man who was found luxuriating in the umbrageous coma of a tree to which he could lay no claim, with a basket full of the fruit in his possession, tied "spread-eagle" fashion to the trunk for nearly a day, the monotony of his durance being varied by periodical flagellations.

Loureiro thus describes the reputed qualities of the two Olives:

C. album. Drupæ muria conditæ olivis Europæis similes sunt colore, et quodammodo etiam forma et sapore; sunt autem saluberrimæ, ita ut medici non eas denegent ægrotis, experientia docti digestionem et appetitum cibi promovere.

C. Pimela. Drupæ muria conditæ frequenter apponuntur mensis, non minus sapidæ quam olivæ, sed stomacho graves.

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* The three very slightly elevated bands, scarcely conspicuous, are represented far too prominently in Konig's figure. (Ann. Bot. vol. i. pl. 7, fig. 1. g.)

For the following notice of these trees, extracted and translated from a description of the 'Memorabilia of Kwangtung,' published in 1801, I am indebted to my friend Mr. W. F. Mayers, H.M.'s Acting Consul for Che-foo.

"The *Yüeh Chung Kien Wên* states as follows:—Of the *Lan* there are two species, the black and the white. Of both the tree grows high and perfectly straight, usually with the trunk quite devoid of branches except at the summit, where it throws out its crown. There are male and female [trees], the male having flowers [only] and the female fruit. The males are properly called *Lang-kung* (*i. e.* male or 'sir,' *Canarium*), and do not produce fruit, but if brought in contact with the female the fruit forms. The fruit resembles that of the *Tsao* (Jujube, or Chinese Date), about an inch or more in length, and is devoid of angles. The earliest growth hangs downward, those grown later point upwards. The fruit is ripe in the eighth or ninth month, when the cultivators mount the tree by means of ladders, and knock the fruit down with sticks. Another way is to make an incision of about an inch [in width] in the trunk, on its east side, and to rub in some coarse salt, which causes the fruit on the east side to fall down spontaneously; and similarly on the three remaining sides of the tree. The white *Lan*, if not eaten until after the *Peh Lu* period (8th September), does not cause sickness. Its qualities are heating. When eaten, the tapering points at either end should be removed. On first being chewed, the flavour is bitter and astringent, but after a time the flavour develops itself and turns sweet. The colour is white. When boiled in water at a high temperature the colour changes to a pale green, and its fragrance becomes as that of the *Lan* (*Epidendrum ?*), so that it sweetens the breath. Of the black *Lan*, the fruit is larger, and the flesh has greater substance. Its qualities are mild, and its flavour astringent, with a slightly sweet taste. It should be boiled in tepid water, until it becomes soft and the purple skin puffs out, when it is fit to eat. If the water be cold, it will emit a gummy exudation; and if too hot, the flesh will harden, so that it is important to use tepid water only. In the southern portion of the Pwan-yü district the black *Lan* is largely grown, and the fruit, after being deprived of its stone, is cooked and preserved with brine as an article of merchandise, which has a sale far and near."

The stones of some species of *Canarium* are beautifully and elaborately carved by the Chinese; and, when set in gold, or separated by gold filigree beads, form exceedingly handsome brooches or bracelets. These are popularly supposed by foreigners, and even by many Chinese, to be cut out of *peach-stones;* though a very cursory inspection will show that this is a fallacy. Amoy is renowned for this kind of work, and, so highly is it esteemed, that some beads I purchased on the spot, to have made into a bracelet, cost me a dollar (4*s.* 3*d.*) each; a very large sum, when the slight remuneration in China for skilled labour and the cost of native living are borne in mind. These stones, so far as I can judge from the sculptured specimens, seem too large to be the produce of *Canarium Pimela*. They may either belong to a distinct species, or to one of those alluded to by Mr. Hanbury, respecting all of which I may, perhaps, hereafter succeed in gaining some reliable information.

MONOGRAPH OF THE GENUS XIPHION.

By J. G. Baker, F.L.S.

(*Continued from page* 14.)

6. *X. junceum*, Klatt; bulbo ovoideo parvo membranaceo-tunicato, apice setoso, caule flexuoso pedali vel sesquipedali 1–2-floro, foliis caulinis 4–6 distichis falcatis filiformibus subpedalibus, spathæ valvis ventricosis 2–3-uncialibus ad basin limbi attingentibus, pedicello ovario breviore, perianthii tubo ovario 2–3-plo longiore, limbo flavescente 1½–2-unciali, segmentis exterioribus lamina obovato ungue cuneato æquante, interioribus erectis oblanceolatis longe unguiculatis, exterioribus distincte brevioribus 2–3-plo angustioribus, stigmatibus cum cristis segmentis exterioribus subæquilongis.—*X. junceum*, Klatt, Linnæa, vol. xxiv. p. 570; Parlatore, Fl. Ital. vol. iii. p. 304. *Iris juncea*, Desf. Fl. Atlant. 1/39, t. 4 (1798); Lam. Encyc. vol. iii. p. 305; Bert. Manip. p. 4. t. 1; Fl. Ital. vol. i. p. 244; Boiss. Voy. vol. ii. p. 603; Munby, Fl. Alg. vol. i. p. 6, non Brotero. *I. imberbis*, Poiret, Voy. Barb. vol. ii. p. 85 (1789). *I. mauritanica*, Clusius, Spreng. Syst. vol. i. p. 159. *Diaphane stylosa*, Salisb. Hort. Trans. vol. i. p. 305.

Bulb ovoid, 6–9 lines thick, with several dark brown membranous coats passing into a crown of fibres round the base of the stem, the rootlets fibrous. Stem wiry, erect, flexuose, usually single-headed, with 2–3 filiform leaves placed laxly on each side, which are not above 1½–2 lines broad where they leave the stem, the lowest often a foot long. Spathe ventricose, the valves 2–3 inches long, reaching up to the base of the limb at the flowering time. Pedicel within the spathe very short, ovary 8–9 lines long. Tube very slender, 12–18 lines long above the ovary. Limb pale yellow, veined with reddish-brown, the outer divisions with an obovate limb 6–9 lines broad, equalling in length the cuneate claw. Inner divisions erect, oblanceolate, 3–4 lines broad, 12–15 lines long, narrowed gradually into a slender claw. Stigmas, including the crest, nearly as long as the outer divisions, 5–6 lines broad.

Hab. Tangiers, Salzmann! Algeria, not unfrequent, Schimper! Bové! Jamin, 100!, etc. Italy; near Genoa, and on the south coast of Sicily, De Notaris, etc.

A very well-marked species, by the character of its inner segments connecting *Euxiphion* with *Juno*. Willkomm and Lange's description evidently refers to the true plant, but Brotero and Webb have both confused it with *lusitanicum*, and we are not able to say what the Catalonian plant, gathered by Webb, which is referred here, really is.

7. *X. reticulatum*, Klatt; bulbo ovoideo fibroso-tunicato, foliis radicalibus solum productis post anthesin maturatis 6–9-uncialibus erectis anguste linearibus profunde canaliculatis, scapo 1–3-unciali unifloro, valvis spathæ 2–3-uncialibus haud ventricosis, ovario vix stipitato, tubo 2–3-unciali sæpe exserto, perianthii limbo 1½-unciali saturate violaceo segmentis æquilongis oblanceolatis interioribus paulo brevioribus, stigmatibus cum cristis limbo æquilongis.—*Xiphion reticulatum*, Klatt, Linnæa, vol. xxiv. p. 572. *Iris reticulata*, M. Bieb. Fl. Taur. Cauc. p. 34. t. 1; Cent. Pl. Rar. Ross. t. 11; Led. Fl. Ross. vol. iv. p. 93; Sweet, Flow. Gard. ser. ii. t. 189; Bot. Mag. t. 5577; Lodd. Bot. Cab. t. 1829; Journ. Hort. Soc. vol. iii. t. 166; Regel, Gartenfl. 1864, t. 452. *Neubeckia reticulata*, Alefeld, Bot. Zeit. 1863, p. 269.

Bulb ovoid, 9–12 lines thick, with a coat of densely matted grey fibres and from the base a tuft of fibrous rootlets. Leaves produced from the apex of the bulb only, not fully developed at the flowering time, erect, finally 6–9 inches long, linear-filiform, deeply channelled down the face, not more than a line broad, clasping by a sheath at the base. Scape not more than 2–3 inches high, erect, the flower always solitary. Valves of the spathe 2–3 inches long, not ventricose, 3–4 lines broad. Ovary shortly stalked in the spathe. Tube very slender, 2–3 inches long above the ovary, usually longer than the spathe at the flowering time. Limb deep violet, 1½ inches deep in the wild plant. The outer divisions 5–6 lines broad, with a bright yellow keel internally; the inner erect, as long but rather narrower. Stigmas with the crest as long as the limb, the latter about half an inch deep.

Hab. Georgia, Hohenacker! Szovits! Fischer! etc. Caucasus, Klustine! Iberia, Stevens! Zamba! Wilhelms! Armenia, Aucher-Eloy, 5344! Zohrab! Huet du Pavillon! etc. Kurdistan, Olgum! Garden! Cappadocia, Montbret! Aucher-Eloy, 2132! Palestine, near Jerusalem, Dr. Roth!

This is a very distinct plant, now a great favourite in our gardens from its early flowering, bright deep colours and delightful violet fragrance. It flowers in England in February and March, and in its native regions always grows high up on the mountains, near the snows. A Lebanon plant, gathered by Gaillardot, (Herbier de Syrie, n. 93!) differs from the type by its larger flowers (limb quite 2 inches deep), which are considerably paler in colour, with outer segments 8–9 lines broad, with a lamina nearly as long as the claw, but erect; the inner divisions not more than a quarter of an inch broad.

8. *X. diversifolium*, Klatt; bulbo ovoideo fibroso-tunicato, caule erecto 1–2-floro 6–9-pollicari, foliis linearibus erectis caule superantibus, spathæ valvis 2–3-uncialibus vix ventricosis ad basin limbi attingentibus, pedunculis 2–3-uncialibus, perianthii tubo obsoleto, limbo ultra unciali segmentis oblanceolatis æquilongis, stigmatibus cum cristis limbo æquantibus.—*X. diversifolium*, Klatt, Linnæa, vol. xxiv. p. 572. *Iris diversifolia*, Steud. in Schimp. Pl. Abyss. sect. 2. n. 1173. *Vieusseuxia Schimperi*, Hochst. in Schimp. Pl. Abyss. sect. 2. n. 1296, A. Rich. Tent. Fl. Abyss. vol. ii. p. 305.

Bulb ovoid, an inch thick, the outer coats fibrous, the inner dark brown, membranous, prolonged 2–3 inches up the stem. Stem erect, 6–9 inches high, 1–2-flowered. Leaves linear, erect, overtopping the flowers, 3 lines broad where they leave the stem. Spathe 2½–3 inches deep, the valves linear, attaining the base of the limb at the flowering time. Peduncle as long as the spathe. Tube of the perianth quite obsolete. Limb 12–15 lines deep; the outer and erect inner divisions obovate-lanceolate, subequal. Stigmas as long as the limb, 2 lines broad at the base of the crest.

Hab. Abyssinia, in dry mountain meadows near Enschedcap, Schimper!

Evidently a very distinct species, but I have seen only two dried specimens in indifferent condition.

9. *X. Sisyrinchium*, Baker; bulbo globoso fibroso-tunicato, caule firmo flexuoso 3–12-unciali vel ultra 2–6-floro, foliis productis plerisque duobus distichis falcatis angustissime linearibus dorso semiteretibus 6–12-uncialibus, spathæ valvis 1½–2-uncialibus valde ventricosis, ovario subsessili, tubo gracili subunciali, perianthii limbo tenerrimo cæruleo-violaceo

1–1½-unciali, segmentis exterioribus obovato-spathulatis, interioribus angustioribus paulo brevioribus erectis, filamentis deorsum cum stylo connatis, stigmatibus cum cristis segmentis interioribus æquilongis.—*Iris Sisyrinchium*, L. Sp. Plant. vol. i. p. 59; Sibth. and Sm. Fl. Græc. vol. i. p. 30. t. 42; Cav. Ic. t. 193; Rédouté, Lil. t. 29 et 458; Bert. Ital. vol. i. p. 244, et multorum aliorum. *Gynandiris Sisyrinchium*, Parl. Nuov. Gen. p. 49; Godr. Fl. Franc. vol. iii. p. 246; Klatt, Linnæa, vol. xxiv. p. 577; Willk. Bot. Zeit. 1860, p. 132. *Moræa Sisyrinchium*, Gawl. Bot. Mag. t. 1407. *Iris ægyptia*, Delile, Frag. Fl. Arab. p. 6. *I. fugax*, Tenore, Neap. vol. i. p. 15. t. 4. *Moræa fugax*, Tenore, Syll. p. 26. *M. Tenoreana*, Sweet, Brit. Flow. Gard. t. 110.

Bulb globose, edible, 6–12 lines thick, coated with coarse brown fibres, the new one superposed on the old one, the rootlets fibrous. Stem firm, flexuose, varying from 2–3 inches to more than a foot high, producing usually a leaf on each side some distance from the base. Leaves linear-subulate, falcate, sometimes a foot long, glaucescent, deeply channelled on the face, semiterete on the back, not more than 2–3 lines broad. Flowers 1 to 5 to a stem, when numerous usually close to one another, opening in succession, very fugacious. Spathes 1½–2 inches deep, very ventricose, reaching up to the base of the limb. Ovary sessile in the spathe, linear, 6–8 lines long. Tube slender, about an inch deep. Limb violet-purple, 12–18 lines deep; the outer divisions obovate-spathulate, the blade about as long as the claw, 5–6 lines broad, yellow and glabrous or slightly pubescent (*I. ægyptia*, Delile) down the centre on the inside; inner divisions erect, oblanceolate, 2–3 lines broad, a little shorter than the outer ones. Filaments agglutinate in the lower part to the stigmas. Stigmas as long as the inner divisions, with a crest as long as the blade.

Hab. Portugal, Welwitsch! Spain, Bourgeau, 465! 1676! Boissier! Corsica, Soleirol! Kralik! Minorca and Majorca, Cambessedes! Sicily, Dr. Alexander Prior! Huet du Pavillon! Algeria, Bove! Jamin! Italy, E. Thomas! Tenore! Sardinia, Jan! E. Thomas! Crete, Sieber! Corfu, Sir W. C. Trevelyan! Egypt, Schimper! Aucher-Eloy, 2134! Asia Minor, Heldreich! E. Forbes! Fleischer! Syria and Palestine, Gaillardot! Roth! Euphrates, Chesney! Central Arabia, Pelly! Beloochistan, Stochs! Affghanistan, Griffith, 5910! Flowers in England in May.

Var. *minor*, Cambess. Enum. Balear. 142. Boiss. Voy. Esp. vol. ii. p. 602. *Iris monophylla*, Boiss. et Heldr. Exsicc. *Gynandiris monophylla*, Klatt, Linnæa, vol. xxiv. p. 578.

Whole plant not more than 3–4 inches high; stem with a single leaf only, limb of perianth an inch deep, the outer divisions 3–4 lines broad.

Majorca, Cambessedes! Greece, Von Heldreich! Egypt, Martins!

Reported by Klatt from the Cape of Good Hope, but surely this must be a mistake.

(To be continued.)

ON THE FORMS AND DISTRIBUTION OVER THE WORLD OF THE BATRACHIUM SECTION OF RANUNCULUS.

By W. P. Hiern, M.A.

About seventy-five different specific names have been published for the plants coming under this section. According to the views held by various botanists with reference to their specific distinctness, many of the names have been used in different senses and with different impressions of the range of forms to be included under them.

After studying the plants both in the living state and in the herbarium, I conclude, taking into consideration the intricate network of connecting links that seem to me to break down specific characters in several directions, that the best and most philosophical course to follow is to unite all the forms under one aggregate species. Nor am I alone in this opinion, for Spenner, in his 'Flora Friburgensis,' published in 1829, adopted such an arrangement and called the collective species by the name of *Ranunculus hydrocharis*, describing at the same time several varieties; this name I adopt.

Again, Drs. J. D. Hooker and T. Thomson, in the first volume of their 'Flora Indica,' published in 1855, expressed their willingness to unite all the segregate species known to them into one; and Mr. Bentham, in the first edition of his 'Handbook of British Botany,' did combine all the British forms into one species. It is right, however, to mention that in his second edition of the same work, Mr. Bentham reverted to the decision of Linnæus and allowed two species; and also that Dr. Hooker, in his recent 'Students' Flora of the British Islands,' has recognized three species, namely, *R. aquatilis*, *R. Lenormandi*, and *R. hederaceus*.

Such, however, are the variations and remarkable differences presented by many of the forms that it is desirable, and almost necessary, in order to understand the plants, at least for the purposes of local floras, to mention, and as far as possible define, the principal forms and give them distinctive names.

For this purpose I have drawn up an artificial key for referring any given specimen to the name which most nearly applies to it; this I have tried to make as practically useful as possible, but the reticular bond of union which prevails in nature amongst the members of this group is so complicated and involved as to render any such ready method impossible in some cases and difficult in several; and the difficulty has been increased in consequence of the large number (35) of ultimate forms that have been included.

Concurrently with the ultimate forms, I have cited several names of a comparatively collective meaning, which can be used when further determination cannot be reached. Thus botanists of whatever views with reference to specific values, will be enabled to stop at will and help themselves, consistently with the nature of the case, to whatever name they please.

In nearly every case I have employed already published specific names for the forms, whether aggregate or segregate, which I recognize. One new form only I have named as of co-ordinate value with the rest of my ultimate forms, namely, No. 3, *Lobbii*. This is a native of California and Oregon, and is interesting as occupying a place under the *hederaceus* group, and yet making some approach to the *aquatilis* group.

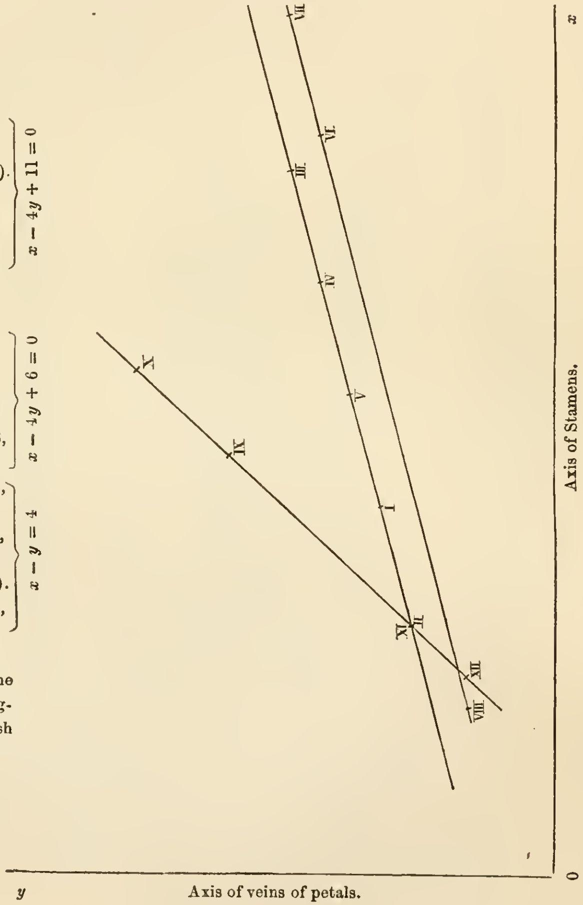
In a paper on this subject read before the Cambridge University Natural Science Society on October 25th, 1864, I attempted a geometrical representation of the British species in the following manner. Each species was placed in a given plane with reference to two axes of co-ordinates, the abscissa being the same number of units of length as the normal number of stamens, and the ordinate being the number of veins on each petal. After being placed in this manner it appeared that the species numbered 1–5 in the fifth edition of Babington's 'Manual of British Botany' lay in a straight line whose equation was $x - 4y + 11 = 0$, that those numbered 6–8 lay in a parallel straight line whose equation was $x - 4y + 6 = 0$, and that the remaining four, 9–12, lay in a third straight line, whose equation was $x - y = 4$.

The accompanying figure was contained in the above-mentioned paper. The unit of length is three-twentieths of an inch.

References.

I. *R. trichophyllus* (13, 6).
II. *R. Drouetii* (9, 5).
III. *R. heterophyllus* (25, 9).
IV. *R. confusus* (21, 8).
$x - 4y + 11 = 0$
V. *R. Baudotii* (17, 7).
VI. *R. floribundus* (26, 8).
VII. *R. peltatus* (30, 9).
VIII. *R. tripartitus*, (6, 3).
$x - 4y + 6 = 0$
IX. *R. circinatus* (15, 11).
X. *R. fluitans*, (18, 14).
XI. *R. cœnosus* (9, 5).
XII. *R. hederuceus* (7, 3).
$x - y = 4$

The names follow the fifth edition of Babington's 'Manual of British Botany.'



In the same paper it was noticed that while in *R. confusus*, Godr., the flowering peduncles are nearly straight, and the stamens are longer than the head of carpels; in the allied *R. Baudotii*, Godr., the stamens are shorter than the head of carpels, and the peduncles are much and firmly arched. Thus a provision appears to be made to enable the pollen in each case easily to reach the stigmas and fertilization to take place.

KEY TO THE PRINCIPAL FORMS.

Ranunculus hydrocharis, *Spenner*.

- Submersed leaves wanting or very rare. Fruit receptacle glabrous or rarely setose. Carpels glabrous. (*R. hederaceus*, L.)
  - Receptacle spicate, longer than the petals. . . . . . 1. *tenellus*.
  - Receptacle rounded or flat
    - Petals 2 or 3 times as long as the calyx.
      - Leaves 5-lobed. Stamens 14–16 . . . . . . 2. *saniculæfolius*.
      - Leaves 3-lobed. Stamens 5–11.
        - Leaves tripartite, truncato-cordate. Petals usually 3-veined. Style lateral. Carpels few . . . . . . 3. *Lobbii*.
        - Leaves trifid, rotundato-reniform. Petals 5-veined. Style terminal. Carpels several . . . . . . 4. *Lenormandi*.
    - Petals not or scarcely exceeding the calyx.
      - Leaves with 3 or 5 entire or subentire lobes. Receptacle glabrous.
        - Floating. Lobes of leaves rounded, shallow. Style terminal . . . . . . 5. *homœophyllus*
        - On mud. Lobes of leaves somewhat deltoid, the middle one projecting. Style lateral . . . . . . 6. *hederæfolius*.
      - Leaves trifid, with divided lobes. Receptacle setose . . . . . . 7. *intermedius*.
- Submersed leaves nearly always present. Receptacle hairy or rarely glabrescent. (*R. aquatilis*, L.)
  - Segments of submersed leaves usually short or slender, frequently diverging. Receptacle hairy. (*R. aquaticus*, Lam.)
    - Floating leaves present. (*R. heterophyllus*, Web.)
      - Carpels usually glabrous.
        - Petals 3-veined, rather acute at apex . . . . . . 8. *tripartitus*.
        - Petals 5–∞-veined, rounded at apex. (*R. Petiveri*, Koch.)
          - Petals wholly white . . . . . . 9. *hololeucus*.
          - Petals yellow at the base.
            - Receptacle more or less conical. (*Batrachium obtusiflorum*, S. F. Gray.)
              - Stamens longer than the heads of carpels . . . . . . 10. *confusus*.
              - Stamens shorter than the heads of carpels . . . . . . 11. *Baudotii*.
            - Receptacle rounded . . . . . . 12. *triphyllus*.
      - Carpels usually hairy. (*Batrachium heterophyllum*, S. F. Gray.)
        - Outer base of lateral segments of floating leaves much rounded. (*R. peltatus*, Schrank.)
          - Peduncles and petioles of floating leaves very long and slender . . . . . . 13. *elongatus*.
          - Peduncles and petioles of floating leaves not both very long and slender.
            - Submersed leaves very long and subparallel . . . . . . 14. *penicillatus*.
            - Submersed leaves of moderate length and diverging.
              - Floating leaves suborbicular . . . . . . 15. *floribundus*.
              - Floating leaves truncato-cordate . . . . . . 16. *truncatus*.

- Segments of floating leaves wedge-shaped. (*R. diversifolius*, Schrank.)
  - Floating leaves truncate, fan-shaped . . . . 17. *rhipiphyllus.*
  - Floating leaves suborbicular or with radiant segments.
    - Floating leaves rather thick, often hairy beneath . . . . 18. *radians.*
    - Floating leaves thin, glabrous . . . . 19. *Godronii.*
- Floating leaves wanting. (*R. fœniculaceus*, Gilibert.)
  - Leaves cincinnate, with short, divaricate, crowded segments, usually surrounding the stem, and nearly in one plane, which is usually perpendicular to the stem . . . . 20. *circinatus.*
  - Leaves otherwise.
    - Leaves cuneato-flabelliform, on distinct petioles; divisions short, lanceolate-linear . . . . 21. *Bungei.*
    - Leaves not cuneato-flabelliform, usually subsessile; divisions linear or capillary. (*R. pectinatus*, Dubois.)
      - Subterrestrial. Leaf-segments linear, somewhat fleshy . . . . 22. *cæspitosus.*
      - Aquatic. Leaf-segments capillary. (*R. capillaceus*, Thuillier.)
        - Carpels with a long beak . . . . 23. *longirostris.*
        - Carpels with a short beak.
          - Peduncles equalling or usually but little exceeding the leaves.
            - Segments of leaves rigid or diverging. (*R. rigidus*, Pers., non Godr.)
              - Carpels not very numerous. Receptacle globular or oval.
                - Leaves distant, oval, with regular outline. Receptacle oval . . . . 24. *aspergillifolius.*
                - Leaves with irregular outline or pencilled. Receptacle globular.
                  - Segments of leaves diverging . . . . 25. *trichophyllus.*
                  - Segments of leaves rigidly converging . . . . 26. *rigidus.*
              - Carpels very numerous. Receptacle ovato- or elongato-conical . . . . 27. *Rionii.*
            - Segments of leaves weak and collapsing. (*R. flaccidus*, Pers.)
              - Leaves, flowers, and peduncles small or of moderate size.
                - Stamens few (5–12).
                  - Receptacle nearly cylindrical. Stem filiform . . . . 28. *confervoides.*
                  - Receptacle oblong. Stem slender, scarcely filiform . . . . 29. *Drouetii.*
                - Stamens several . . . . 30. *submersus.*
              - Leaves, flowers, and peduncles large . . . . 31. *pseudofluitans.*
          - Peduncles long, usually exceeding the leaves.
            - Flowers large; petals 9–11-veined. Carpels hairy . . . . 32. *sphærospermus.*
            - Flowers small; petals about 5-veined. Carpels glabrous.
              - Stamens longer than the head of carpels . . . . 33. *salsuginosus.*
              - Stamens shorter than the head of carpels . . . . 34. *marinus.*
- Segments of submersed leaves long, usually stout, and subparallel. Receptacle glabrescent . . . . 35. *fluitans.*

Chronological List of Published Specific Names with References and Localities.

A.D.
1753. *hederaceus*, L. Sp. Pl. 781.—England, Belgium.
1753. *aquatilis*, L. Sp. Pl. 781.—Europe.
1778. *aquaticus*, Lam. Fl. Fr. 3. 184.—France.
1778. *fluitans*, Lam. Fl. Fr. 3. 184.—France.
1780. *heterophyllus*, Web. in Wigg. Prim. Holsat. 42.—Holstein.
1780. *fluviatilis*, Web. in Wig. Prim. Holsat. 43.—Holstein.
1782. *peucedanifolius*, Gilib. Fl. Lith. v. 261.—W. Russia.
1782. *fœniculaceus*, Gilib. Fl. Lith. v. 261.—W. Russia.
1782. *diversifolius*, Gilib. Fl. Lith. v. 262.—W. Russia.
1786. *trichophyllus*, Chaix in Villars Hist. Pl. Dauph. i. 335.—France.
1789. *capillaris*, Gater. Pl. Montauban, 102.—France.
1789. *divaricatus*, Schrank Baiers. Fl. 2. 104.—Bavaria.
1789. *peltatus*, Schrank Baiers. Fl. 2. 103.—Bavaria.
1794. *circinatus*, Sibth. Fl. Oxon. 175.—England.
1795. *flaccidus*, Pers. in Ust. Ann. Bot. 14. 39.—Europe.
1795. *rigidus*, Pers. in Ust. Ann. Bot. 14. 39.—Europe.
1795. *macrophyllus*, Pers. in Ust. Ann. Bot. 14. 39, non Desf.—Europe.
1796. *hederæfolius*, Salisb. Prodr. 373.—Europe.
1798. *peucedanoides*, Desf. Fl. Atlant. 1. 444.—N. Africa.
1799. *cæspitosus*, Thuill. Fl. Par. 2nd ed. p. 279, non Wall.—France.
1799. *capillaceus*, Thuill. Fl. Par. 2nd ed. p. 278.—France.
1804. *pumilus*, Poir. Encl. 6. 133, non Thuill.—France.
1804. *pantothrix*, Brot. Fl. Lusit. 2. 375.—N. Portugal.
1807. *abrotanifolius*, Auct. in Pers. Syn. 2. 106.—Germany.
1808. *tripartitus*, DC. Ic. Pl. Gall. rar. p. 15. t. 49.—W. France.
1818. *biternatus*, Sm. in DC. Regn. Veg. Syst. Nat. i. 237.—Str. Magellan, S. America.
1821. *obtusiflorum*, S. F. Gray, Nat. Arr. Br. Pl. ii. 721.—Britain.
1822. *stagnatilis*, Wallr. Sched. Crit. 285.—Germany.
1824. *saniculæfolius*, Viv. Fl. Lib. p. 29. t. 11. fig. 2.—N. Africa.
1829. *hydrocharis*, Spenn. Fl. Friburg. iv. 1007.—Germany.
1830. *tenellus*, Viv. Pl. Ægypt. Dub.; non Gay, nec Nutt.—Egypt.
1830. *omiophyllus*, Ten. Fl. Neapol. iv. 338.—Italy.
1831. *hydrophilus*, Bunge, En. Pl. Chin. p. 2, non Gaudich.—China.
1833. *pectinatus*, Dubois Orleans, ed. ii. no. 1030.—France.
1834. *paucistamineus*, Tausch in Flora, xvii. ii. p. 525.—Bohemia.
1834. *Bauhini*, Tausch in Flora, xvii. ii. p. 525.—S. Europe.
1834. *cœnosus*, Guss. Fl. Sic. Suppl. p. 187.—Sicily.
1837. *Lenormandi*, Schultz in Flora, xx. ii. 726.—France.
1838. *reniformis*, Desp. Fl. Sarth. p. 3, non Wall.—France.
1839. *Baudotii*, Godr. Essai.—Sarrebourg.
1839. *longirostris*, Godr. Essai.—St. Louis, Missouri.
1839. *rigidus*, Godr. Essai, non Pers.—Cape of Good Hope.
1840. *Petiveri*, Koch in Sturm Deutschl. Fl. Hf. 82. fig.—Europe.
1840. *triphyllos*, Wallr. in Linnæa, 14. 584.—Hartz.
1841. *Bungei*, Steud. Nomencl. Bot. 2. 433.—China.
1841. *affinis*, F. Schultz in Flora, xxiv. ii. 558.—Orleans, France.
1842. *marinus*, Arrh. and Fr. in Fr. Mant. iii. 52.—Baltic Sea.

1843. *minutus*, Döll. Reinisch. Fl. 550, non Gay.—Europe.
1844. *ololeucos*, Lloyd Fl. Loir. 3.—France.
1845. *Bachii*, Wirtgen in Verh. Nat. Pruss. Rhnld. 2. 22.—Germany.
1846. *confervoides*, Fr. Sum. Veg. Scand. 1. 139.—Lapland and Finland.
1846. *intermedius*, Knaf in Flora, xxix. i. 289.—Bohemia.
1848. *Drouetii*, Schultz *teste* Godr. in Gren. and Godr. Fl. Fr. i. 24.—France.
1848. *bipontinum*, Schultz in Gren. and Godr. Fl. Fr. i. 24.—France.
1848. *villosum*, Schultz in Gren. and Godr. Fl. Fr. i. 24.—France.
1848. *confusus*, Godr. in Gren. and Godr. Fl. Fr. i. 22.—France.
1848. *Rionii*, Lagg. in Flora, xxxi. i. 49, 50.—Switzerland.
1850. *Godronii*, Gren. in Schultz Archiv. 169, 172 (nom. sol.).—France.
1852–3. *setigerum*, Fr. Bot. Utfl. ex Hartman.—Scandinavia.
1853. *radians*, Revel in Act. Soc. Linn. Bord. xix. 122.—France.
1854. *hypotrichus*, Turcz. in Bull. Mosc. 1854, part ii. 275.—Constantinople.
1855. *floribundus*, Bab. in Ann. Nat. Hist. ser. 2, vol. xvi. p. 397.—England.
1856. *trinacrius*, E. and A. Huet du Pavillon in Pl. Sic. n. 1.—Sicily.
1856. *sphærospermus*, Boiss. et Blanche in Boiss. Diagn. ser. ii. n. 5. p. 6.—Syria.
1857. *rhipiphyllus*, Bast in Boreau, Fl. Cent. Fr. ed. iii. vol. 2, p. 11.—Angers, France.
1859. *lutulentus*, Song. et Perr. in Not. Pl. Sav.—Savoy.
1861. *Kochii*, Beurl. in Hartm. Skand. Fl. 8th ed. p. 95.—Scandinavia.
1861. *Friesii*, Beurl. in Hartm. Skand. Fl. 8th ed. p. 95, non Hartm.—Scandinavia.
1863. *penicillatum*, Dumort. Monogr. Batr. p. 12.—France and Belgium.
1863. *truncatum*, Dumort. Monogr. Batr. p. 11.—Flanders.
1863. *aspergillifolium*, Dumort. Monogr. Batr. p. 14.—Flanders.
1863. *salsuginosum*, Dumort. Monogr. Batr. p. 14, non Pall.—Ostend.
1867. *pseudofluitans*, Bab. Br. Bot. 6th ed. p. 7.—Britain.
1869. *stenopetalus*, Syme, Rep. Lond. Exch. Club, 1869, p. 7, non Hook.—Britain.
1869. *elongatus*, F. Schultz in Billotia, vol. i. cent. 38–40. p. 113.—E France.

(*To be continued.*)

SHORT NOTES AND QUERIES.

Nepenthes.—Dr. Hooker has contributed to a recent number of 'Nature' the following summary of the distribution of the species of *Nepenthes*, which genus he has been monographing for the forthcoming volume of De Candolle's 'Prodromus.'—The genus *Nepenthes* extends from Madagascar on the west to N.E. Australia, the Louisiade Archipelago, and New Caledonia on the east; embracing within these limits thirty species, most of which have well-marked characters in the pitcher, but which, with only two exceptions, present a wonderful uniformity in the structure of both flower and fruit. It has two foci of maximum development; the Malay Peninsula (including Sumatra), and Borneo, in both of which localities the species are not only more numerous, but more gigantic than in any other country. No fewer than twenty-one species inhabit these two countries, of which thirteen are common to both; but, what is very remarkable, the intervening island of Java contains but one representative of the genus, and that a totally different species from either the Bornean or the Malayan; thus confirming the fact first brought to light by the Dutch naturalists, of the close biological relationship between the two former localities, to the exclusion of Java. Only one species has a wide range, the *N. phyllamphora*, which extends from Sumatra to Borneo, Amboyna, China, etc., but is absent from the island of Java.

Proceeding from the Malayan islands westwards, we find one species in east Bengal, more allied to the Javanese than to any other; another in Ceylon, the old *N. distillatoria* of Linnæus (a name long usurped in our gardens by the Bengal plant), which presents the first departure from the typical structure of the genus, having a spreading paniculate inflorescence; a character shared by those in Madagascar and the Seychelles. Proceeding further west to the African islands, we find still further deviations from the type, which now extend to the structure of the seed and fruit; for whereas all the eastern species have very long appendages to the seed, which are no doubt instrumental in its dispersion, these appendages are very short in the Madagascar species, and are wholly absent in the Seychelle one; which thus presents a case analogous to that of the prevalence of wingless insects on oceanic islets. Lastly, the Seychelle Islands species further differs from all others in the structure of its ovary and capsule.

To sum up, deviation from the type of the genus commences on the western confines of the principal centre of its distribution, namely in Ceylon; and the initial deviation, that met with in the Ceylon species, is the slightest, but is propagated (so to speak) westwards, equally characterizing the two African islands Pitcher-plants, which again deviate still further from the type; the maximum deviation, however, occurs, not in the great sub-continental Island of Madagascar, where the endemic species has a considerable range; but in the very small oceanic Archipelago of the Seychelles, where the only native species is confined to the one mountain summit of one island of the group!

The only other fact that struck me as bearing upon this subject of distribution is, that though present in the Seychelles, the genus *Nepenthes* is absent from the Mascarene group (Mauritius, Bourbon, and Rodrigues). This is only one instance of the broad distinction that exists between the vegetation of these Archipelagos, and which is in some way connected with the fact that the Mascarene group is volcanic, the Seychelles group formed of granite and quartz, Coincident and perhaps co-ordinate with these phenomena of plant distribution, geographical position, and geological structure, are the facts that the flora of the Seychelle Archipelago is more Asiatic, and the florulæ of its several islets very uniform; whilst the florulæ of the islets of the Mascarene Archipelago differ wonderfully, and in their totality are more African than Indian. The flora of the Mascarene group may hence be regarded either as a very ancient outlying province of the African, or as consisting of a more modern assemblage of plants, derived at various periods from Africa, but subsequently much altered by causes operating in the several islets; or more probably its peculiarities are attributable to both causes. Long as the Mascarene and Seychelle islets have been colonized, under Dutch, French, and English rule, their floras are still very imperfectly known; so much, however, of Mascarene botany is known, as to show that its relations with those of the Seychelle group and Madagascar, and the relations of all these with India and Africa, are most complicated, and present one of the most puzzling problems in Phytogeographical Science.

EMPETRUM NIGRUM, *L.*—In reply to the Hon. J. L. Warren's inquiry (p. 7), concerning this plant, allow me to say that I find it tolerably abundant on Cannock Chase, Staffordshire. Cannock Chase is mostly a wild flat moorland, with only one or two slight elevations. *Empetrum* also grows on Sutton Coldfield, generally here by running streams; both these stations are recorded by Purton in his 'Midland Flora' (1818). I also find another truly montane plant in both these localities,—*Vaccinium Vitis-Idæa*,—rather plentiful and of vigorous growth on Cannock Chase, and scattered and more stunted in habit on Sutton Coldfield. In the marshes of Cannock Chase and the bogs of Sutton *Vaccinium Oxycoccus* occurs. I have no doubt that at one time all the country between Cannock and Sutton has been one large moorland. At Sutton, too, I find two Mosses which may be considered as truly montane species, viz. *Amblyodon dealbatus* and *Hypnum commutatum*, var. *condensatum*.—JAMES BAGNALL.

THE FIRST SYNTHESIS OF A VEGETABLE ALKALOID has just been announced by Dr. Hugo Schiff, of Florence ('Reports of the Berlin Chemical Society,' vol. iii. p. 946). When alcoholic ammonia acts at a temperature not above 100° C., on butyraldehyd, two bases are produced,—one, dibutyraldine, having the following composition:—

$$\underbrace{C_8 H_{17} N O}_{\text{Dibutyraldine.}} = \underbrace{2 C_4 H_8 O}_{\text{Butyraldehyd.}} + N H_3 - H_2 O.$$

By the dry distillation of dibutyraldine there is produced, among other products, a final one, which is found to possess all the characteristic properties of—in fact, to be identical with—conia, the active principle of Hemlock (*Conium maculatum*). The reaction takes place as follows:—

$$\underbrace{C_8 H_{17} N O}_{\text{Dibutyraldine.}} = H_2 O + \underbrace{C_8 H_{15} N.}_{\text{Conia.}}$$

—WALTER FLIGHT.

XANTHIUM SPINOSUM.—Mrs. Sankey, of Dover, has recently sent me a specimen of this plant gathered at Beckley, about twelve miles from Hastings, in a hop-garden.—W. W. SAUNDERS.

VEGETABLE BROOM-MATERIALS.—The different vegetable-materials employed for making brooms and brushes are often the objects of inquiry, though they have been pretty well ascertained. Brooms used for sweeping the streets, and also coarse scrubbing-brushes, are made with Piassaba fibre, which consists of the detached fibro-vascular bundles at the base of the petioles of a Brazilian Palm (*Attalea funifera*, Mt.), forming what is technically called the *reticulum*. A finer fibre is obtained from another Palm, *Leopoldinia Piassaba*. Softer scrubbing-brushes are made of Cocoa-nut fibre, the "coir" of commerce. Carpet brooms and some kinds of clothes brushes are made of the panicles of the Broom-corn (*Sorghum* *vulgare*, Pers.), after the grain has been detached. (The axes of the female spikes of another grass, *Zea Mays*, L., are sold in London under the name of "French firelights," at the rate of twelve a penny). Fine hand-brushes for clothes are said to be made in Italy from the long fibrous roots (rhizomes) of a grass, *Andropogon Ischæmum*, L. (Jury's Report Internat. Exh. 1862, Class 4, C, p. 19). A similar product of another species, *A. muricatum*, is the well-known khus-khus or veti-vert of perfumers. In the West of France I have seen brooms for sale made of the haulm of a species of *Camelina*,—a way, no doubt, of working up a waste product in the cultivation of an oil-plant. Finally, I learnt at Roundstone in Connemara that the beautiful *Erica hibernica*, Syme, locally known as French Heath, is found, from its miniature tree-like growth, to make capital brooms.—W. T. THISELTON DYER.

PERTHSHIRE PLANTS.—In the report of the December meeting of the Edinburgh Botanical Society (p. 26), Dr. Dickson and Mr. Sadler are recorded to have found *Œnanthe pimpinelloides* and *Pimpinella magna* in Perthshire. By the kindness of the latter botanist I have been favoured with specimens of both plants. He says that they grew near Hamilton House, in meadow-ground by the side of a burn, in company with *P. Saxifraga* and *Bunium flexuosum*. Mr. Sadler adds that he first collected *P. magna* there in 1858 and believes it had been previously observed; he considers both plants to be "truly wild." Mr. Watson, who has seen specimens from Perthshire collected by Dr. Dewar, brackets province 15 (*vide* 'Compendium,' p. 190), intimating a suspicion of the species having been introduced there. Whatever may be the real state of the case as regards this species, which certainly occurs in Yorkshire and Durham ('Comp.' l. c.), any grounds of suspicion with regard to it must hold with still greater force in the case of *Œ. pimpinelloides*, a plant restricted to South England (north limit, Worcester and Suffolk, 'Comp.' p. 192), and with a strong bias for low coast districts. An outlying station so distant from the main area of the species must remain under a suspicion of introduction by human agency, at all events till some approach towards a bridge over the gap is made by the discovery of intermediate localities.* It is to be wished that some of the many local botanists of Scotland would carefully and impartially investigate the rather numerous cases where more or less of doubt rests upon the real nativity of species in the northern portion of Great Britain. The *addition* of a species to the flora of any district is of no greater scientific importance than the *exclusion* of one by the demonstration of a fallacy in its claims to nativity. Mr. Watson has done excellent service, if he has applied his tests rigorously, in admitting into his summaries no alleged facts which will not bear a thorough scrutiny. The form of *Pimpinella magna* sent to me by Mr. Sadler is one with the leaflets cut into linear segments, of which I have also seen specimens from Kent and Hertfordshire; it has a very different aspect to the normal form, and was distinguished by Morison (Hist. Oxon. vol. iii. p. 284) and J. Sherard (Ray, Syn. ed. iii. p. 213), but has dropped out of notice in modern British Floras. A parallel variety occurs in *P. Saxifraga* as I have seen in Cheshire specimens. Mr. Sadler has also kindly sent me a specimen of the *Centaurea* from the Ochil (not *Achil*, as printed at p. 28) Hills. It is a rayed plant, and one of the numerous intermediates between typical *C. Jacea* and *C. nigra*, which have been collectively called *C. nigrescens*, but divided into many "species" by Boreau and other French botanists. This Perthshire plant is, of the extremes, nearer *C. Jacea* than *C. nigra*, the upper phyllary-appendages being more lacerated than pectinate, and quite covering the phyllaries themselves. Mr. Sadler has named it *C. pratensis*, Thuill., a sufficiently accurate determination if we may trust Billot's and other published Continental specimens. Its different aspect and involucres distinguish it from the usual South and West of England rayed form, which is, perhaps, *C. serotina* of Boreau, wrongly quoted as a synonym of *C. amara*, L., in Gren. and Godr. Fl. de France, vol. ii. p. 240, from which it is very different.—HENRY TRIMEN.

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* Since this was written I have seen in the 'Scottish Naturalist' (p. 24) a remark by Mr. Dawson that "a number of curious plants growing near Hamilton House" were "probably introduced by the late Mr. Buchanan Hamilton." This may be considered strong additional ground for distrust, and to turn the scale against the claim of *Œ. pimpinelloides*.

AMBROSIA PERUVIANA, *Willd.*—In 1863 I met with a single individual of this species in a stubble field at Margate, Kent. Very much puzzled what to make of it, I, by chance, showed it to Dr. Seemann, who immediately recognized it as a South American weed he was quite familiar with.—W. T. THISELTON DYER.

"BABINGTON'S CURSE" (p. 24.)—Perhaps this name is a reminiscence of a passage in the Rev. Charles Kingsley's 'Miscellanies,' vol. i. p. 181. Describing the vegetation of a chalk-stream, he proceeds:—"To this list will soon be added our Transatlantic curse, *Babingtonia diabolica*, alias *Anacharis Alsinastrum*. It has already (1858) ascended the Thames as high as Reading; and a few years more, owing to the present *aqua vivarium* mania, will see it filling every mill-head in England, to the torment of all millers. Young ladies are assured that the only plant for their *vivariums* is a sprig of *Anacharis*, for which they pay sixpence—the market value being that of a wasp, flea, or other scourge of the human race; and when the *vivarium* fails, its contents, *Anacharis* and all, are tost into the nearest ditch; for which the said young lady ought to be fined five pounds, and would be if Governments governed. What an 'if!'" It is almost a dangerous experiment to parody so closely formal botanical names; synonyms have been quoted pedantically quite as absurd.—W. T. THISELTON DYER.

ALYSSUM INCANUM, *L.*—In answer to Mr. Watson's question in Vol. VIII. p. 383, I beg to say that I picked a single specimen of *Alyssum incanum* in a clover-field about two miles from Ross, Herefordshire, in the summer of either 1866 or 1867. The plant was solitary; nor have I noticed it before or since in the same locality.—AUGUSTIN LEY.

GALIUM TRICORNE, *With.*, is usually described as having umbellate cymes with only 1–3 flowers. In examples, however, which I met with in a potato-field at Garden Cliff, Gloucestershire, the cymes are compound with as many as nine pedicels, not always equally fruit-bearing, though in most instances both the cocci are developed.—W. T. THISELTON DYER.

QUERIES.—8. What is the use of the white hairs on the inside of the corolla of the Foxglove?

9. Seeing that yellow flowers scarcely ever have white varieties, what is the explanation of the curious "fading" of the golden petals of many species of *Ranunculus* to snow-white?

10. In herbariums, when there is change of colour in flowers, it is ordinarily to a mahogany brown. Why do the crimson *Erica cinerea, Lythrum Salicaria, Lagerstrœmia*, and others, turn purple?

11. Are the leaves of *Fraxinus excelsior* simple or compound? I have found young ones with the leaflets perfectly confluent, as in an ordinary pinnatifid leaf; but, when the foliage falls in autumn, every leaflet disarticulates from the rachis. Can a simple leaf change into a compound one?

12. What measure is there for the belief held by some that the leaves of *Ranunculus Lingua, R. Flammula*, and, I suppose, all the other linear-leaved species in this genus, are only phyllodia? Will the same reasoning apply to the leaves of *Bupleurum?*

13. What is the internal and highly elastic thread in the stems of many little *Caryophyllaceæ*, also in *Veronica hederifolia, Claytonia*, etc.? and what is the purpose of the elasticity?

14. Does the foliage of the common Asparagus consist of true *leaves?* If not, what are those innumerable green bristles?

15. Coltsfoot, when in bloom, has its capitulum quite erect. Subsequently, while the fruit is ripening, it is pendulous. Eventually, when the beautiful globe of silky pappus is developed, it is erect again. What is the physiological cause of the middle condition?

16. *Caprifoliaceæ* are said to be distinguished from *Cinchonaceæ* by the want of stipules. What are the organs which every learner calls stipules on the petioles of *Viburnum Opulus?*

17. Why is *Rumex* said to have a single perianth, in two whorls, when, to all appearance, the flower is formed of a distinct calyx and corolla,—the six pieces similar in colour and texture, as in the Rushes and Lilies? —L. H. GRINDON.

18. CYPRIPEDIUM CALCEOLUS.—Prof. H. G. Reichenbach, in describing a new Orchis in the 'Gardeners' Chronicle' (1870), p. 1342, says *à propos* of the extirpation of Orchideæ, "If we had the acquaintance of some magistrates in Ocaña we would induce them to adopt the Yorkshire system, where the peasants are told to prevent the extirpation of *Cypripedium Calceolus* in a not very civil but very successful manner." What is this system or manner?—HENRY TRIMEN.

Reports.

NEW SPECIES OF PHANEROGAMOUS PLANTS PUBLISHED IN GREAT BRITAIN DURING THE YEAR 1870.

The following is an alphabetical catalogue of the new genera and species published during the past year (1870) in these periodicals:—'Botanical Magazine,' 'Floral Magazine,' 'Gardener's Chronicle,' Hooker's 'Icones Plantarum,' 'Journal of Botany,' and 'Refugium Botanicum.' The 'Journal of the Linnean Society,' and proceedings of other scientific

bodies have not been included. In most cases only the diagnostic characters and native country have been quoted, lengthy descriptions and other details being omitted. To save unnecessary repetition, in the case of species first described in this Journal a reference to the page of last year's volume is all that is given.

Amaryllis (Hippeastrum) Leopoldii, *Hort. Veitch.* (*Amaryllidaceæ*) (aff. *A. pardinæ*). Not described.—*Gard. Chron.* 1870, p. 733 and fig. 140; also figured in *Flor. Mag.* plates 475, 476.

Aphanocalyx, *Oliv. gen. nov.* (*Leguminosæ, Cæsalpinieæ*). Calyx obsoletus v. ad dentes minutos reductus. Petalum 1 posticum, bracteolas superans, obovato-cuneatum; petala lateralia et postica obsoleta, v. interdum petalum 1 laterale posticum subæquans v. eodem brevius. Stamina 10, omnia antherifera; filamenta filiformia, glabra, libera v. basi leviter coalita; antheræ parvæ, late ellipticæ, versatiles, longitudinaliter dehiscentes. Ovarium dense pilosum, breviter stipitatum, biovulatum; stylus filiformis; stigma terminale capitatum. Legumen . . .—Arbor inermis, inflorescentia excepta glabra; foliola uuijuga, coriacea, 2–3-nervosa. Flores in racemis brevibus axillaribus congesti. Bracteæ scariosæ, deciduæ; bracteolæ alabastrum bivalvatim includentes mucronulatæ, per anthesin persistentes.

A. cynometroides, *Oliv. sp. unica.*—Hab. Mount John, Kongui River, West Tropical Africa. Flowering in September, G. Mann.—*Hook. Ic. Plant.* t. 1066.

Artabotrys Hongkongensis, *Hance (Anonaceæ).—Vide Journ. Bot.* Vol. VIII. p. 71.

Asparagus virgatus, *Baker* (*Liliaceæ, Asparagineæ*); fruticosa, erecta, 4–5-pedalis, caule primario dimidio inferiore nudo, dimidio superiore copiose divaricatim ramoso, ramulis gracilibus virgatis angulatis sulcatis, foliis minutis inconspicuis lanceolatis membranaceis calcare nullo modo spinoso, cladodiis ternis setiformibus mucronatis erecto-patentibus internodiis subæquantibus facile deciduis, floribus sparsis solitariis e nodis plerisque efoliatis nutantibus, pedicellis brevibus gracilibus infra medium articulatis.—Hab. Cape Colony, Hort. Saunders, from Mr. Cooper. Next *Asparagopsis scoparia*, Kunth.—*Ref. Bot.* t. 214.

Barleria Mackenii, *Hook. f.* (*Acanthaceæ*); glaberrima, caule obtuse 4-gono, foliis recurvis anguste ovato- vel elliptico-lanceolatis subacutis petiolatis tenuissime strigillosis integerrimis, floribus terminalibus paucis in axillis supremis, bracteis parvis subulatis, sepalis exterioribus amplis late ovato- vel rotundato-cordatis obtusis venosis, interioribus parvis e basi ovato subulato-acuminatis, corollæ purpureæ tubo infundibuliformi calycem æquante, limbi lobis subæqualiter rotundatis basi atropurpureis, staminodiis 3, 2 lateraliter minutis subulatis intermedio lato apiculato approximatis.—Hab. Natal, Hort. Kew., sent by Mr. M'Ken. —*Bot. Mag.* t. 5866.

Bothriospora, *Hook. f. gen. nov.* (*Rubiaceæ, Hamelieæ*). Calycis tubus obconicus; limbi lobi 4 v. 5, oblongi, obtusi, erecti, persistentes. Corolla breviter infundibuliformis, fere rotata, fauce villosa; lobi 4–5, oblongi, obtusi, quincunciales. Stamina 5, fauci corollæ inserta, filamentis filiformibus exsertis basi pilosis; antheræ breves, oblongæ, dorso insertæ, utrinque obtusæ, recurvæ. Discus annularis. Ovarium 4- v. 5-loculare; stylus erectus, stigmatibus 4 v. 5 linearibus erectis obtusis; ovula perplurima, placentis tumidis axi ovarii peltatim affixis inserta.

Bacca parva, subglobosa, succulenta, 4–5-locularis, polysperma. Semina minuta, oblonga, testa coriacea profunde foveolata, albumine carnoso; embryo subcylindricus.—Arbor v. frutex elatus, cortice deciduo, ramulis tenuibus teretibus ultimis et inflorescentia pubescentibus. Folia opposita, petiolata, ovato-oblonga. Stipulæ intrapetiolares, lanceolatæ, cito deciduæ. Cymæ ad apices ramorum terminales, 3-chotome ramosæ. Flores parvi, umbellati, albi, pedicello apice 2-bracteolato. Bacca flava.

B. corymbosa, *Hook. f.* (*Euosmia corymbosa*, Benth. in Hook. Journ. Bot. iii. 219; Walp. Rep. ii. 489).—Hab. North Brazil and Guiana, river Tintaro, Schomburgk, 1838, and Rio Branco, Schomburgk, n. 794. Mouth of the Solimoes at its junction with the Amazons, Spruce, January, 1851.—*Hook. Ic. Plant.* t. 1069.

Brachystelma (Dichælia) ovata, *Oliver* (*Asclepiadaceæ*); multicaule, caulibus erectis di-trichotomis cum foliis crispule pubescentibus, foliis parvis caulinis ovatis ovato-lanceolatisve breviter petiolatis, floribus in nodis solitariis brevissime pedunculatis decurvis, corollæ tubo brevissimo, laciniis limbi anguste lineari-attenuatis apice incurvis cohærentibus extus scabride puberulis, corona staminea lobis exterioribus brevibus basi subquadratis divaricatim bifidis, interioribus integris ovatis obtusis.—Hab. Colesberg, South Africa, Mr. Arnott in Hort. Kew.—*Ref. Bot.* t. 226.

Brassia farinifera, *Lind. et Reichb. f.* (*Orchidaceæ*); glumacea, brachysepala, brachypetala, labello pandurato antice emarginato cum denticulato interposito, limbo antice serrulato, callis prostratis angulatis, velutinis geminis in basi, denticulis præpositis, area farinosa semicirculari anteposita.—Hab. Discovered by Mr. Wallis in Ecuador, and sent by M. Linden, of Brussels.—*Gard. Chron.* 1870, p. 923.

Calochortus Leichtlinii, *Hook. f.* (*Liliaceæ*); humilis, foliis gramineis $\frac{1}{8}$ poll. latis longe vaginantibus dorso rotundatis facie concavis anguste acuminatis glauco-viridibus, marginibus incurvis, scapo gracili foliis paullo longiore 2–3-floro, spathis foliis consimilibus, floribus $2\frac{1}{2}$ poll. diam. late campanulatis, sepalis ovato-lanceolatis recurvis dorso medio fuscis, petalis demum reflexis latissime obovato-cuneatis apiculatis marginibus vix erosis albis plaga parva purpurea supra foveam nectariferam $\frac{1}{2}$-circularem, basin versus extus gibbosis intus pauciciliatis, antheris flavis obtusis, ovario lineari-oblongo, stylo brevi, stigmatibus 3 brevibus recurvis.—Hab. California, Hort. Kew., from Roezl, communicated by Herr Leichtlin.—*Bot. Mag.* t. 5862; also figured in *Flor. Mag.* plates 509, 510.

Cassia (Chamæsenna) crassiramea, *Benth.* (*Leguminosæ, Cassieæ*); fruticosa, glaberrima, aphylla, ramis valde incrassatis, pedunculis ad nodos solitariis bifloris, antheris vix rostratis, legumine lineari (plano?).—Closely allied to *C. aphylla*, Cav.—Hab. South America.—*Hook. Ic. Plant.* t. 1063.

Cattleya velutina, *Reichb. f.* (*Orchidaceæ*); perigonio bene coriaceo, sepalis ligulatis acutis recurvis, petalis cuneato-oblongis acutis hinc lobosis, labelli laciniis lateralibus humillimis semiovatis columnam involventibus dorso liberam, lacinia antica ovata subacuta denticulata venis omnibus discoque velutinis.—Perhaps a hybrid between *C. Walkeriana*, Gard., and *C. Schilleriana*, Reichb. f. Hab. Probably Brazilian, having been received in a collection obtained through an agent whose headquarters are at Rio. The sepals are naturally recurved.—*Gard. Chron.* 1870, p. 140.

Cereus fulgidus, *Hook. f.* (*Cactaceæ*); caule elongato gracili ramoso, internodiis elongatis 1 poll. diam. profunde 3–4-gonis, angulis compressis margine obtusis fasciculato-spinosis, spinis ad 10 parvis gracilibus, areolis tomentosis, floribus 6–8 poll. diam., calycis tubo 3–4-pollicari cylindrico hirsuto, bracteolis parvis ovato-lanceolatis incurvis rubris obsito, foliolis calycinis 3–4-seriatis lanceolatis recurvis acuminatis pallide coccineis externis angustioribus, corollinis 2–3-seriatis obovato-oblongis suberectis apiculatis sanguineis fulgidis, staminibus petalis brevioribus, stylo staminibus longiore, stigmatibus ad 15 subulatis radiantibus.—Hort. Kew., of unknown history; perhaps a hybrid between *C. Pitajaya*, Jacq., and some scarlet-flowered Cactus.—*Bot. Mag.* t. 5856.

CISSUS PAUCIDENTATA, *Ernst (Vitaceæ).—Vide Journ. Bot.* Vol. VIII. p. 374.

C. SEXANGULARIS, *Ernst.—Vide Journ. Bot.* Vol. VIII. p. 374.

CLEMATIS (FLAMMULA) CÆSARIATA, *Hance (Ranunculaceæ).—Vide Journ. Bot.* Vol. VIII. p. 71.

CŒLOGYNE PSITTACINA, *var.* HUTTONI, *Reichb. f.* (*Orchideæ*); labelli lacinia antica cuneato-oblonga nec cordata, carina in nervo medio melius expressa; pseudobulbus 5–6 pollices altus, costis validis septem obtusis, pyriformis, diphyllus; folium plicatum, cuneato-oblongum, acutum, ultra pedale; pedunculus (?); sepala ligulata, acuta, pallide viridia, valde carinata; petala linearia, acuminata; labellum trifidum; laciniæ laterales semiovatæ, antice acutangulæ, lacinia media cuneato-ovata acuta; carinulæ transversæ acutangulæ, biseriatæ in basi confluentes, anterius usque in basin laciniæ anticæ divergentes, utrinque biseriatæ, seria mediana valde obliterata; color albus, laciniæ laterales fusco pictæ, fundus rufus, carinulæ omnes atro-brunneæ; columna trigona, antice super androclinium expansa, superne denticulata, albida antica flava, lineis brunneis geminis antica sub fovea, foveæ limbus inferne bidentatus.—Very nearly related to *Cœlogyne speciosa*, Lindl., yet widely differing both in colour and in the crests. Originally only known from Amboyna. Obtained from Messrs. Veitch, who got it from their lamented collector, Hutton.—*Gard. Chron.* 1870, p. 1053.

COTYLEDON (ECHEVERIA) ATROPURPUREA, *Baker* (*Crassulaceæ*); breviter caulescens, glabra, foliis dense rosulatis atropurpureis glaucis obovato-spathulatis ultra duplo longioribus quam latis acutis dimidio inferiore spathulatim angustatis, ramorum floriferorum confertis valde reductis, floribus 20–25 subæquilateraliter racemosis, bracteis linearibus pedicellis patentibus subæquantibus, sepalis lanceolatis æqualibus patulis corolla saturate rubra distincte pentagona subtriplo brevioribus.—HAB. Mexico? Hort. Saunders, from M. De Smet, of Ghent.—*Ref. Bot.* t. 198.

C. (ECHEVERIA) CARNICOLOR, *Baker;* acaulis, glabra, foliis dense rosulatis crassis oblanceolato-spathulatis triplo longioribus quam latis acutis pallide glauco-rubris, ramorum floriferorum numerosis confertis, floribus 6–12 in racemum æquilaterale modice densum dispositis, bracteis linearibus, pedicellis erecto-patentibus brevioribus, sepalis lanceolatis subæqualibus, corolla coccinea distincte pentagona triplo brevioribus.—HAB. Mexico? Hort. Saunders.—*Ref. Bot.* t. 199.

C. DECIPIENS, *Baker;* acaulis, glabra, foliis parvis pallide viridibus subteretibus obtusis basi auriculatis, ramorum sterilium numerosis densis, ramorum floriferorum laxioribus similibus erecto-patentibus, floribus 12–15 in corymbum densum ramis scorpioideis dispositis, pedicellis subnullis, sepalis linearibus æqualibus ascendentibus corolla alba nullo modo pentagona duplo brevioribus, corollæ segmentis falcato-patentibus tubo æquantibus.—HAB. Peru, Hort. Saunders, from Mr. Farris. Habit of a *Sedum* of the *reflexum* set.—*Ref. Bot.* t. 200.

COURSETIA ERIANTHA, *Benth.* (*Leguminosæ Galegeæ*); fruticosa, foliis unifoliolatis, foliolo late ovato v. orbiculari basi late cordato subtus albo-tomentoso, racemis axillaribus laxe 2–4-floris, calycis laciniis e basi lata subulatis, vexillo tomentoso.—HAB. La Ronca, at an elevation of 9–10,000 ft., Pearce.—*Hook. Ic. Plant.* p. 52.

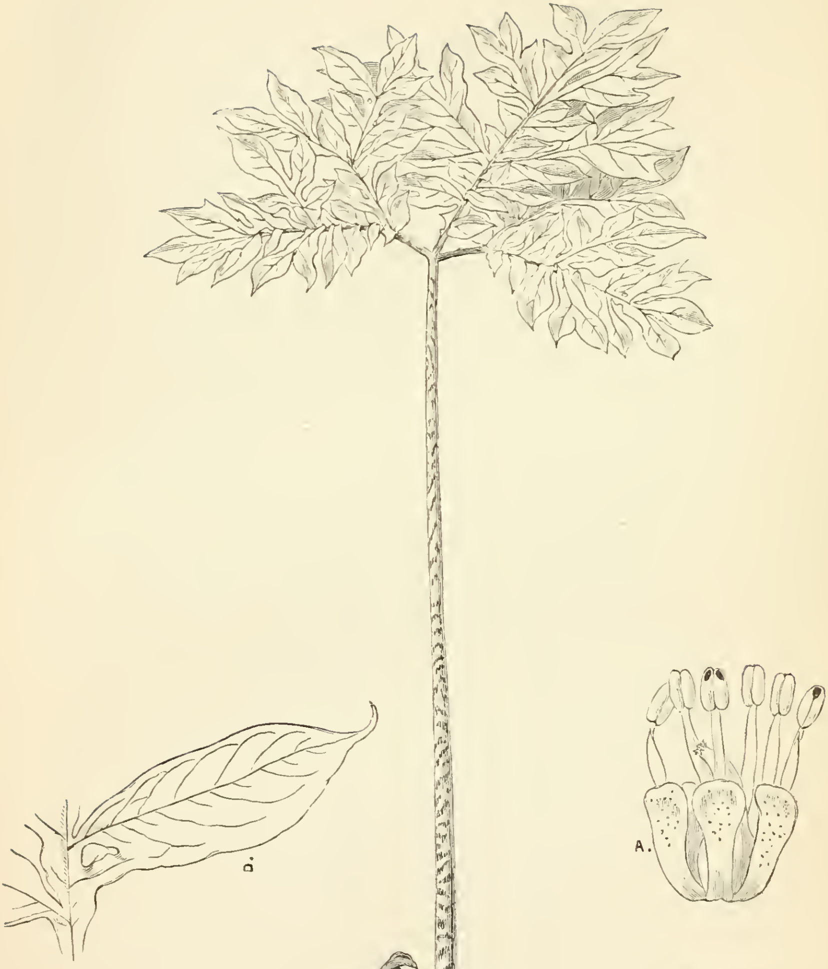
C. ORBICULARIS, *Benth.*; fruticosa, foliis unifoliolatis, foliolo suborbiculari subtus albo-tomentoso, pedicellis axillaribus 1–3-nis, pedunculo communi subnullo, calycis laciniis lanceolatis, vexillo glabro.—HAB. Pampas (of Bolivia?), at an elevation of 8–9000 ft., Pearce.—*Hook. Ic. Plant.* t. 1065.

CUCUMIS HOOKERI, *Naudin* (*Cucurbitaceæ*); annuus, multicaulis; flagellis bimetralibus, gracilibus, scaberrimis; foliis profunde 5-lobatis, lobis obtusis crenulato-denticulatis, sinubus inter lobos rotundatis; floribus luteolis; fructibus pollicem humanum crassitudine æquantibus aut paulo superantibus, ovoideo-cylindricis, dense aculeatis, colorem purpureo-fuscum quum adoleverunt induentibus, lineolis albis circiter decem longitudinaliter fasciatis.—HAB. From the interior of Africa.—*Gard. Chron.* 1870, p. 1503.

DENDROBIUM CHRYSOTIS, *Reichb. f.* (*Orchideæ*) (aff. *Dendrobio fimbriato*, Wall.); petalis ligulatis obtuse-acutis, labello cuneato oblongo rhombeo, alte fimbriato, insulis asperis velutinis utrinque in unguis basi, callo transverso per unguem, tota superficie bene barbellata; antro in basi columnæ ligulato, margine superiori medio in fissuram exeunte.—HAB. We believe this comes from Assam.—*Gard. Chron.* 1870, p. 1311.

DIOSCOREA (§ 16 Kunth, En. Pl. vol. v. p. 391) RETUSA, *Mast.* (*Dioscoreaceæ*); ramis inermibus, teretibus, puberulis; foliis sparsis petiolatis, digitatis, 5–7-foliolatis, foliolis petiolatis membranaceis puberulis oblongis, basi rotundatis vel attenuatis, apice retusis vel acutiusculis, abrupte longiusculeque acuminatis, margine sinuatis vel integris, 1-nerviis; racemis masculis 4 vel pluribus, axillaribus, gracilibus pendentibus plurifloris, circiter 2 poll. long. rachibus racheolisque (his floribus æquilongis) puberulis; perianthii bibracteolati clausi conici laciniis 6, biserialibus, conniventibus, inæqualibus, externis ovatis cymbiformibus, margine ciliatis, internis oblongis obtusis intus concavis; staminibus fertilibus 3, sepalis oppositis; antheris didymis introrsis; staminodiis petalis oppositis petaloideis, spathulatis, apice concavis; styli vestigio apice tripartito; flore femineo adhuc ignoto.—HAB. In Africa australi, Burke, n. 266 (pl. masc.) in Herb. Kew; Cooper, v. v. in Hort. Veitch.—The branches spring from a tuber, and are twining, cylindrical, and puberulous, destitute of spines. The leaves are alternate, loosely scattered (2–3 inches apart), provided with puberulous leaf-stalks, thickened at the base, and as long as the blade of the leaf, which latter is in general outline, roundish, and digitate. Leaflets 5–7, petiolulate (petiolules ½ inch long, thickened at the base), slightly downy, especially below and along the nerves, oblong obtuse, sometimes markedly retuse, rounded at the base, sinuous at the margins, 1-nerved, the midrib excurrent into a rather long, slender acumen. Racemes axillary, slender, pendulous, as long as the leaf-stalks, 1½–2 inches long, many-flowered. Flowers pendent, less than a quarter of an inch long, on short downy pedicels, provided at the apex with two ovate-oblong acuminate bracts, unequal in size and shorter than the flower.

Tab. 113


A.
D.
B.
C.
W.G. SMITH.

Dracontium elatum, *Masters.*

Perianth of six connivent segments, the three outer broadly ovate-obtuse, concave, ciliolate at the margins, the three inner oblong, hooded; fertile stamens three, opposite the outer segments of the perianth, and attached to their very base. Filaments very short. Anthers yellow, roundish, didymous, 2-celled, introrse, dehiscing longitudinally. Staminodes 3, opposite to and half the length of the inner segments of the perianth, petaloid, purplish, spoon-shaped. Rudiment of the style short, columnar, minutely 3-lobed at the apex. Female flower unknown. It is probable that a specimen (without number), gathered by Gerard at Natal, and also preserved at Kew, is the female of this plant. In the latter the leaf-lobes are narrower, more tapering, and much more tomentose than in Messrs. Veitch's plant; the flower-spikes are axillary, tomentose; the ovaries are also clothed with a dense coat of down, and are shorter than the subtending bracts; the segments of the perianth are oblong-obtuse.—*Gard. Chron.* 1870, p. 1149, and fig. 217.

DIPLACHNE SINENSIS, *Hance (Gramineæ)*.—*Vide Journ. Bot.* Vol. VIII. p. 76.

DOLICHANDRONE LAWII, *Seem. (Bignoniaceæ)*.—*Vide Journ. Bot.* Vol. VIII. p. 380.

DRACÆNA CYLINDRICA, *Hook. f.* (*Liliaceæ, Asparagineæ*); caule erecto indiviso folioso, foliis sursum gradatim majoribus patenti-recurvis e petiolo lato obovato-lanceolatis abrupte acuminatis, nervis obscuris, spica sessili terminali amentiformi densa cylindrica obtusa, bracteis ovato-lanceolatis acuminatis tubum angustum perianthii æquantibus, pedicello brevi apice tumido, perianthii laciniis anguste linearibus albis recurvis filamento medio paulo incrassato æquantibus, antheris parvis flavis, stylo gracillimo, stigmate obscure 3-lobo.—HAB. Old Calabar, Hort. Kew., from G. Mann and Rev. W. C. Thomson, being near *D. bicolor, Bot. Mag.* t. 5248.—*Bot. Mag.* t. 5846.

DRACONTIUM ELATUM, *Masters* (*Aroideæ*); cormo oblate-sphæroideo, fibras radicales carnosas superne tantum emittente; foliis radicalibus synanthiis, solitariis vel binis, petiolatis, pedatisectis (diametro 3–4-pedalibus), segmentis primariis 3 vel 5, obovatis impari, interrupte, decursiveque pinnatipartitis, lateralibus interdum apice dichotome divisis, segmentis ultimis oblongo-lanceolatis, acuminatis glabris-costatis, arcuato-nervosis; petiolis 5–6-pedalibus et ultra, teretibus, apicem versus sensim attenuatis, pone basin tuberculatis maculisque violaceis annulosis undulatis notatis; scapo tereti 5–6-pollicari; spatha 8–9-pollicari coriacea, purpurea, fornicata, convergenti-nervosa, longiuscule acuminata acumine inflexo; spadice cylindraceo bipollicari breviter stipitato, ab apice deorsum florente; floribus numerosissimis ebracteatis monochlamydeis, hermaphroditis, arcte approximatis; perianthio 6–7–9-partito; segmentis spathulatis apice cucullatis æstivatione imbricatis; staminibus perianthii segmentis numero æqualibus iisque oppositis demum exsertis, filamentis latis; antheris dorsifixis, bilocularibus, loculis oblongis, apicem versus rima porosa extrorse vel lateraliter dehiscentibus; ovario supero, sub-3-lobo, 3-loculare; stylo crasso subconoideo; stigmate tri-radiato; ovulis in quovis loculo solitariis, placentæ axili, mediante funiculo brevissimo, affixis, campylitropis; fructu adhuc ignoto.—HAB. In Africa occidentali; e Sierra Leone elata, v. v. in Hort. Bull. The *Aroid*, of which a technical description is above given, will not vie in size with the *Godwinia gigas* of Seemann (*Journ. Bot.* Vol. VII. p. 313, t. 96 and 97), but it is very much like it in aspect, as handsome if the element of size be disregarded, closely allied to it in the construction of its flowers, and on botanical grounds equally interesting. Like the *Godwinia*, this *Aroid* was first grown in this country by Mr. W. Bull, in one of whose stoves the plant was in bloom in January, 1870. Its nearest ally seems to be the old *Dracontium polyphyllum*, from which it differs in one or two important points. The native country of our present plant is western tropical Africa, while *D. polyphyllum* is a native of Surinam. From *Godwinia* our plant differs in the simultaneous production of leaf and flower, in the stamens being equal in number to the segments of the perianth, not twice their number, etc. Other points of difference may be seen by comparing the description of that plant with that we now subjoin. Root-stock or corm of the size of a small Turnip, of a depressed spheroidal form, giving off fleshy roots from its upper surface only, exactly as in some *Cyclamens*. Leaves one, or sometimes two, arising from the stock. Leaf-stalk erect, 5–6 feet high and upwards, terete or nearly so, as thick as a man's thumb, or thicker at the base, gradually tapering upwards, covered by an epidermis which is smooth and pinkish above, but from the middle downwards is marked by small, scattered, conical asperities, and wavy bands or blotches of a purplish colour mottled with white. The interior of the leaf-stalk is traversed by a great number of longitudinal air-canals, somewhat symmetrically disposed, the larger in the centre, the smaller at the circumference. The upper extremity of the leaf-stalk divides into three primary branches, which are bent horizontally nearly at right angles to the main stalk, and each of which is terete and slightly channelled on the upper surface; the central branch is undivided, but each of the two lateral ones divides about 4 inches from its base into two widely divergent branchlets. The blade of the leaf spreads horizontally, measures 3–4 feet across, and is pedately divided into three (or into five) main subdivisions, one central and four lateral, two on each side; of these latter the uppermost pair are again dichotomously divided towards the apex. Each of the main subdivisions measures from 12–15 inches in length, is obovate in general outline, dark green above, paler beneath, perfectly smooth, unequally and uninterruptedly pinnatipartite; the central lobes of each of these main subdivisions are opposite to each other and larger than the rest, which are alternate and decurrent at the base along the upper side of the rachis, thus connecting all the segments together; the ultimate segments or partitions are in all cases oblong-lanceolate, acuminate, entire, perforated here and there by irregular holes (D), and traversed by a central rib, prominent on the under-surface, and from the sides of which are given off arcuate secondary veins, which become confluent into an intramarginal nerve running round the segment; the scape or peduncle is erect, terete, 5–6 inches high, as thick as a swan's quill, smooth, rosy-pink, and having precisely the same anatomical structure as the leaf-stalk, but with smaller cells and air-canals; the spathe is erect, boat-shaped, leathery, convolute at the extreme base, prolonged above into a long incurved acumen, externally convex, smooth, purplish-brown, traversed by 7–9 prominent nerves, converging at the apex, internally concave, smooth, rich purple in colour; the spadix is supported within the spathe on a short cylindrical rosy stalk, $\frac{1}{4}$ inch long, as thick as a goose-quill; the spadix itself is erect, cylindrical, about 2 inches long, as thick as a swan's quill, and densely covered with ebracteate, monochlamydeous, hermaphrodite flowers expanding from above downwards; the perianth (A) consists of 6–7–9 distinct spathulate segments, hooded at the top, imbricate in æstivation, and marked by purplish spots; the stamens are equal in number to the perianth segments, and opposite to them; the filaments are erect, flat, ribbon-like, pale rose-coloured, ultimately projecting beyond the segments of the perianth, and attached to the back of the anther below the middle; the anthers are oblong obtuse, extrorse, yellow, 2-lobed, lobes obtuse, bursting at the sides by a terminal pore, which sometimes lengthens into a fissure. Pollen elliptical. The ovary is superior, sub-spheroidal, obscurely 3-lobed, 3-celled, with an axile placenta, dissepiments sometimes complete, in other flowers partially deficient. Style terminal, longer than the ovary, and protruding beyond the perianth, conical, thick, fleshy, curved, purple, terminated by a three-rayed brownish papillose stigma. Ovules solitary in each cell of the ovary, kidney-shaped, attached to the placenta by a very short funiculus. On first opening the spathe it appears as if the upper part of the spadix were covered by stamen-bearing flowers and the lower part by female flowers, the styles of which are directed upwards. In reality, all the flowers are hermaphrodite in structure, though not so in function; the stamens in the upper flowers (A) protrude and shed their pollen upon the upturned stigmas of the lower flowers (B), whose own stamens are still immature and enclosed within the perianth. Obviously this is a provision for a division of labour, as the pollen of the upper flowers impregnates the stigmas of the lower ones. These questions then arise: how, if at all, do the upper flowers get fertilized? and what purpose does the pollen of the lower flowers serve? The answers to these questions are not at present forthcoming. In the accompanying plate (t. 113) for which we are indebted to Dr. Masters, the entire plant is shown much reduced in size; (A) is a flower from the upper part of the spadix; (B), from the lower part, with the style protruding; (C) is a vertical section through the ovary, showing the attachment of the ovules, (D) one of the terminal leaf-lobes with its perforation.—*Gard. Chron.* 1870, p. 344, and fig. lviii.

(*To be continued*).

Botanical News.

The concluding volume of the new edition of 'English Botany' is, we are rejoiced to see, commenced. It will contain the whole of the British Grasses, and students of this difficult Order will doubtless find Dr. Boswell Syme's excellent and elaborate descriptions of great assistance to them.

Dr. L. Pfeiffer, of Cassel, has published a useful index to the vegetable kingdom, "Synonymia Botanica locupletissima Generum, Sectionum vel Subgenerum ad finem anni 1858 promulgatorum." 12,908 genera are enumerated with their synonyms, and arranged according to Endlicher's system; fossil plants are included. It would have been more useful had references to the books where the genus-names were first given, been appended to the name of their authors. A second volume will comprehend an alphabetical index to the whole.

We are glad to hear that the Rev. A. Bloxam, so well known for his critical acquaintance with Roses and Brambles, has been presented to the living of Harborough Magna, near Rugby.

The first part of vol. iv. of the 'Refugium Botanicum' has appeared.

It has been decided that this year's meeting of the British Association in Edinburgh shall commence on August 2nd. Active steps are being already taken by the scientific societies of the city to afford a suitable reception.

Dr. Hermann Beigel, a contributor to our pages, and who is now with the army of General Manteuffel, was decorated, on the 4th of January, with the order of the Iron Cross, which can only be gained by personal bravery on the field of battle.

Dr. George Lawson, formerly of Edinburgh, now Professor of Chemistry and Mineralogy in Dalhousie College and University, Halifax, Nova Scotia, has published a monograph of the *Ranunculaceæ* of Canada and the adjacent parts of British America, with a detailed account of the distribution, within these limits, of all the species.

The following is taken from the 'Times:'—The magnificent collection of Orchids at the Museum of Natural History, in Paris, having been in great part destroyed by the German shells, M. Chevreul, the Director of the Museum, has addressed to the Academy of Sciences the following protest:—"The garden of medicinal plants, founded in Paris by an edict of King Louis XIII., dated January 3rd, 1626, became a Museum of Natural History on the 23rd of May, 1794. It was bombarded in the reign of William I., King of Prussia, Count Bismarck being chancellor, by the Prussian army, on the night of the 8th and 9th of January, 1871. Until then it had been respected by all parties, and by all national and foreign authorities.—Paris, January 9th, 1871." The Academy has determined that the protest of M. Chevreul shall be printed at the head of its reports, and the Committee of Professors of the Museum have decided that a marble monument, with an inscription of the protest, shall be placed in one of the galleries of the building, surrounded with projectiles thrown from the enemy's batteries.

The first number of the 'Scottish Naturalist, and Journal of the Perthshire Society of Natural Science' is before us, consisting of thirty-two well-printed pages on toned paper. Entomology is strongly represented in this number, and there is a paper on "Natural Science Chairs in our Universities," by Dr. Lauder Lindsay. The only botanical article is a short review of Dr. Hooker's 'Student's Flora,' but there are two or three cuttings. We hope the department, in which we take especial interest, which is headed "Phytology" will be extended in future numbers. There are also reports of the doings of six Scotch local societies. We congratulate the Perthshire naturalists on their creditable periodical, which we hope will meet with the support it deserves.

Mr. Howie, Secretary of the Largo Naturalists' Field Club, is compiling a catalogue of the plants of Fifeshire for publication.

An interesting paper on the introduction of Maize into China, written some years since by our valued correspondent, Dr. Hance, assisted by Mr. Mayers, has been printed in the 'Pharmaceutical Journal.' It has hitherto been considered almost certain that this cereal was introduced from America; with the object, therefore, of discovering whether it was cultivated in China previous to the discovery of that continent, Mr. Mayers thoroughly examined the older Chinese works on agriculture and botany. These agree in stating that the grain was brought from Sifan (or Lower Mongolia), a district west of China, at a period probably long anterior to the end of the fifteenth century, though the date of its importation is nowhere even hinted at. The paper is illustrated with reproductions of the characteristic figures of Maize in the 'Pun Ts'ao Kang-mu,' or 'General Treatise on Natural History,' published in 1597. Though these researches cannot be said to settle the native country of *Zea Mays*, they seem to establish the conclusion that the Old World is not originally indebted for it to America.

Professor M. A. Lawson has detected, in the Sherardian herbarium preserved at Oxford, a parcel of plants collected during the voyage round the world made by Dampier in the latter part of the seventeenth century. Only 18 species are mentioned in Ray's 'Historia Plantarum,' vol. iii. p. 225, but the parcel contains 40; some, however, are indeterminable. It will be of interest to know what were the other species found, to be included in the account which we hear it is the Professor's intention to offer to the Linnean Society.

COMMUNICATIONS have been received from:—J. Sadler, T. R. A. Briggs, J. Britten, R. Tucker, Prof. Dickie, Dr. W. Flight, Prof. Thiselton Dyer, J. Bagnall, W. P. Hiern, C. E. Broome, W. W. Saunders, etc.

Several papers and reviews stand over for want of space.

[Mr. H. C. Watson has printed and circulated amongst botanists a protest, in the form of a letter to one of the editors of this Journal, against the notice of the third part of the 'Compendium of the Cybele Britannica,' which appeared in these pages last December (Journ. of Bot. Vol. VIII. pp. 394–397). As this printed letter denies the truth of certain statements contained in that notice, it was thought desirable that it should be placed before all the readers of the Journal. Mr. Watson was therefore requested to allow it to be stitched into the cover of the present number, the Journal offering to be at the expense of printing the necessary copies, but to this request he returned a decided refusal. It would occupy too much space to reprint the letter; probably, however, those who care to see it, will be able to obtain a copy by application to the author. The reviewer's answer to Mr. Watson is printed below.

16th January, 1871.

Dear Mr. Watson,

I have carefully read through the printed letter which you have sent me, and which, though addressed to Mr. Baker, is directed against me, the author of the review to which you object; and I feel it necessary to answer it. It exhibits four charges against me: 1st, that I have misrepresented you; 2nd, that I have unjustly charged you with omission or neglect; 3rd, that I have insinuated piracy or plagiarism on your part; 4th, that I have exhibited an unwarranted dogmatism, arising from ignorance and a desire to display a fancied superiority.

I will dispose of these charges in order.

1st. The "misrepresentation." The statement objected to, I repeated from a review of the first part of the 'Compendium' (also written by me) in the 'Journal of Botany' for December 1868 (Vol. VI. p. 375). As you took no exception to that notice, and have continued your contributions to the Journal and friendship towards me, I had no reason to suppose that any statement in it was erroneous. I greatly regret that I have attributed to you words that you have not published.

2nd. The "charge of neglect." The notice of *Callitriche truncata* appeared in the number of the 'Journal of Botany' for May, 1870. At p. 505 of the third part of your 'Compendium'—and I beg you to notice that my review is of that part alone, and not as you imply ('Letter,' pp. 1, 4), of the whole book—under *Rubus obliquus* you quote from that Journal for "April 1870;" at p. 577, under *Pinus Pinaster*, you mention "June 1870;" and at p. 587, you record *Scirpus parvulus*, from Dorset, where it was not discovered till July 1870. As the "Notes and Corrections" occupy pp. 606–615, they must have been printed after the date last mentioned, July 1870, and the non-insertion of *Callitriche truncata* in those "notes and corrections," may fairly be held an "omission."

3rd. The "implied charge of piracy or plagiarism." The paragraph you quote from my review will not fairly bear any such interpretation. I used the word "requisition"—without a thought of the Franco-Prussian war—to imply that you had quoted, made use of, drawn upon the pages of the 'Journal of Botany' in a legitimate and necessary manner. By "insufficiently quoted," I meant that, instead of giving volume and page, you had been often satisfied with such references as the following:—"Jour. Bot. no. 34" (instead of vol. iii. p. 328), "Journal of Botany, no. 69" (instead of vol. vi. p. 263), "Journal of Botany, 1867" (omitting references to pages 76 and 279), "Journal of Botany, no. 70" (instead of vol. vi.), occurring on pages 475, 530, 549, 609 of this part of the 'Compendium,' and noted down in rapidly going through it.

4th. A wider issue is here raised. Everybody knows that it is no part of the duties of a reviewer to completely elucidate all the doubts and difficulties of the author of the book under notice. The passage which you quote ('Letter,' p. 6) from my review was given by me as an example of your habitual neglect in this part of the 'Compendium' to use all the means at your command for the clearing up of doubtful points. Your 'Letter' makes this want of thoroughness still more evident; indeed, it would seem that, so far as the ultimate data, that is, the plants themselves, are concerned, this part of the 'Compendium' is little or nothing more than a digest of or index to your own herbarium. There was a moral obligation on an author on British geographical botany to, as far as possible, get to the bottom of such a case as the alleged occurrence of *Hieracium præcox* in Britain, and my criticism was, and is, that you neglected to take the absolutely necessary step towards a solution of your difficulty. The existence in your herbarium of twenty-one specimens labelled by Schultz *Hieracium præcox*, and one specimen of a *Hieracium*, collected by Mr. J. E. Bowman, at Dinas Bran, is entirely beside the question, which can be decided only by an examination of the specimen at the British Museum, named by Schultz *Hieracium præcox*, and published by him in the 'Journal of Botany.' I must still hold to my opinion that such neglect has caused a real defect in the third part of the 'Compendium,' and rendered it less useful than it might have been.

Into the region of mere personalities I must decline to follow you. Of course I shall publish this letter.

Believe me, dear Mr. Watson,

Yours faithfully,

HENRY TRIMEN.]

Original Articles.

ON THE FORMS AND DISTRIBUTION OVER THE WORLD OF THE BATRACHIUM SECTION OF RANUNCULUS.

By W. P. Hiern, M.A.

(*Continued from p.* 49.)

(Plate CXIV.)

Ranunculus hydrocharis, Spenner, Fl. Frib. iv. 1007 (1829).

Ranunculoides, Vaillant, Bot. Par. p. 170 (1727). Ranunculus, sect. 1, Grammatocarpi, Biria, Hist. Renonc. p. 32 (1811). Ranunculus, sect. Batrachium, De Cand. Regn. Veg. Syst. Nat. vol. i. p. 233 (1818). Batrachium, S. F. Gray, Nat. Arr. Brit. Pl. vol. ii. p. 720 (1821). *Ranunculus*, trib. *Leucobatrachium*, sect. Hydrelis, Webb and Berth. Hist. Nat. Fl. Canar. vol. iii. pt. 2. sect. i. 6 (1840). *Ranunculus aquatilis*, Hook. f. et T. Thoms. Fl. Ind. vol. i. p. 28 (1855). *Ranunculus aquaticus*, Benth. Handb. Br. Fl. ed. 1. p. 59 (1858). Bentham and Hooker f. in 'Genera Plantarum,' vol. i. p. 6 (1862), state that this group, which has been considered as a distinct genus by some authors, includes a few species which probably ought to be reduced to one or two. Seringe in Mél. Bot. vol. ii. n. 4. p. 49 (1826) expressed his suspicion that there was but one species, and in his printed notes he has spoken more positively. Many of the ante-Linnean European botanists recognized five distinct species.

Scattered over most parts of the world, growing in ponds, pits, ditches, streams, rivers and even seas, occasionally also at the edges of watery places and on mud; mentioned as occurring in Colombia, S. America (see Mosquera, Compend. Geograf. General. Colomb. 1866); but not included in the 'Flora of New Zealand' of Dr. J. D. Hooker, nor in the 'Flora Antarctica' of the same author, nor in the 'Flora Brasiliensis' of Martius and Endlicher. Generally perennial, but occasionally annual. The following groups and forms give the principal modifications of this polymorphous species, but by no means exhaust its variability; numerous intermediate states exist that cannot be completely identified with any of them:—

R. hederaceus, L. Sp. Pl. p. 781 (1753). *R. hederæfolius*, Salisb. Prodr. Stirp. p. 373 (1796). *Batrachium hederaceum*, S. F. Gray, Nat. Arr. Brit. Pl. vol. ii. p. 721 (1821). Batrachium, sect. Platyphylleæ, Dumort. Monogr. (1863). *R. hydrocharis*, B. *homoiophyllus*, *a. hederaceus*, Spenn. Fl. Frib. (1829).—Fig.—Fl. Dan. t. 321. Eng. Bot. t. 2003. Sturm, Deutschl. Fl. p. 67. Rchb. Fl. Germ. 3. 2. Godr. Essai, f. 1. Cosson and Germ. Atl. t. 1. f. 1, 2. Forms 1–7.

Common in Europe and North Africa; occurs also in North America, but not included in either Asa Gray's or Chapman's American Floras. According to Schlechtendal it reaches Siberia and the Aleutian Isles. This group cannot be absolutely separated from *R. aquatilis*, L.; though in most cases it is sufficiently different. Thus *Batrachium peltatum*, *isophyllum*, Fr., and *R. trinacrius*, E. and A. Huet du Pavillon of the latter group have no submersed leaves, or scarcely any, while *Lobbii* of the former shows indications of them, and *intermedius* has its receptacle hairy, and is usually referred to *tripartitus.*

1. TENELLUS.

R. tenellus, Viviani Pl. Ægypt. (1830) ex Dietr. Synops. vol. iii. p. 312 (1843), non Gay (1834) nec Nutt. (1838), Walp. Repert. vol. i. p. 36.

In damp places at Alexandria, Egypt. Creeping. Leaves truncato-cordate, 3-lobed; lobes rounded, obsoletely crenate. "Receptacle spicate, longer than the petals." I have not seen specimens of this form nor of the following.

2. SANICULÆFOLIUS.

R. saniculæfolius, Viviani, Floræ Libycæ Specimen, p. 29. t. 11. f. 2, (1824).

In salt marshes at Syrtis Major, Tripoli. Floating. Leaves 5-fid, on petioles about 2 inches long, with crenate lobes. Peduncles long. Petals three times the length of the calyx. Stamens 14–16.

3. LOBBII, forma nova.

R. hederaceus, var. Torrey in Rep. Exped. Whipple (1857).

North America. Oregon, W. Lobb! 1852, n. 249. California, Bigelow! near 35th degree of latitude in 1853–4, "with *R. aquatilis*, L."

Quite glabrous, annual (?) Stem elongated, floating, 9–12 in. long. Submersed leaves none or rare, rudimentary and resembling adventitious roots. Floating leaves tripartite, truncato-cordate at base, $\frac{1}{4}$–$\frac{2}{3}$ in. wide; lobes equal, oval or oblong, the lateral ones usually notched at apex; petioles slender, $\frac{1}{2}$–$1\frac{1}{3}$ in. long; stipules adnate to the petioles. Peduncles opposite the upper leaves, thicker than the petioles, $\frac{1}{2}$–$\frac{2}{3}$ in. long. Buds globose. Sepals $\frac{1}{12}$ in. long, semi-elliptic, persistent, dark green with scarious margins; petals $\frac{1}{6}$ in. long, obovate-oblong, 3–5-(usually 3-) veined. Stamens 5–9, usually 6; filaments exceeding the heads of young carpels, anthers oval; style lateral, slender, usually long and curved. Carpels 4–6, usually 4, thicker upwards, large in fruit, $\frac{1}{12}$ in. long by $\frac{1}{18}$ thick; receptacle small, depresso-globular.

EXPLANATION OF PLATE CXIV.—*Ranunculus hydrocharis*, Spenn., forma *Lobbii*, Hiern. Fig. 1, 2, 3. From specimens in Kew Herbarium, collected in California by Bigelow. Fig. 4, 5. Lower portion of Mr. Lobb's specimen from Oregon. Fig. 6. Stamens and carpels. Fig. 7. Carpel-head. Fig. 8. Petal. Fig. 9. Carpel.

4. LENORMANDI.

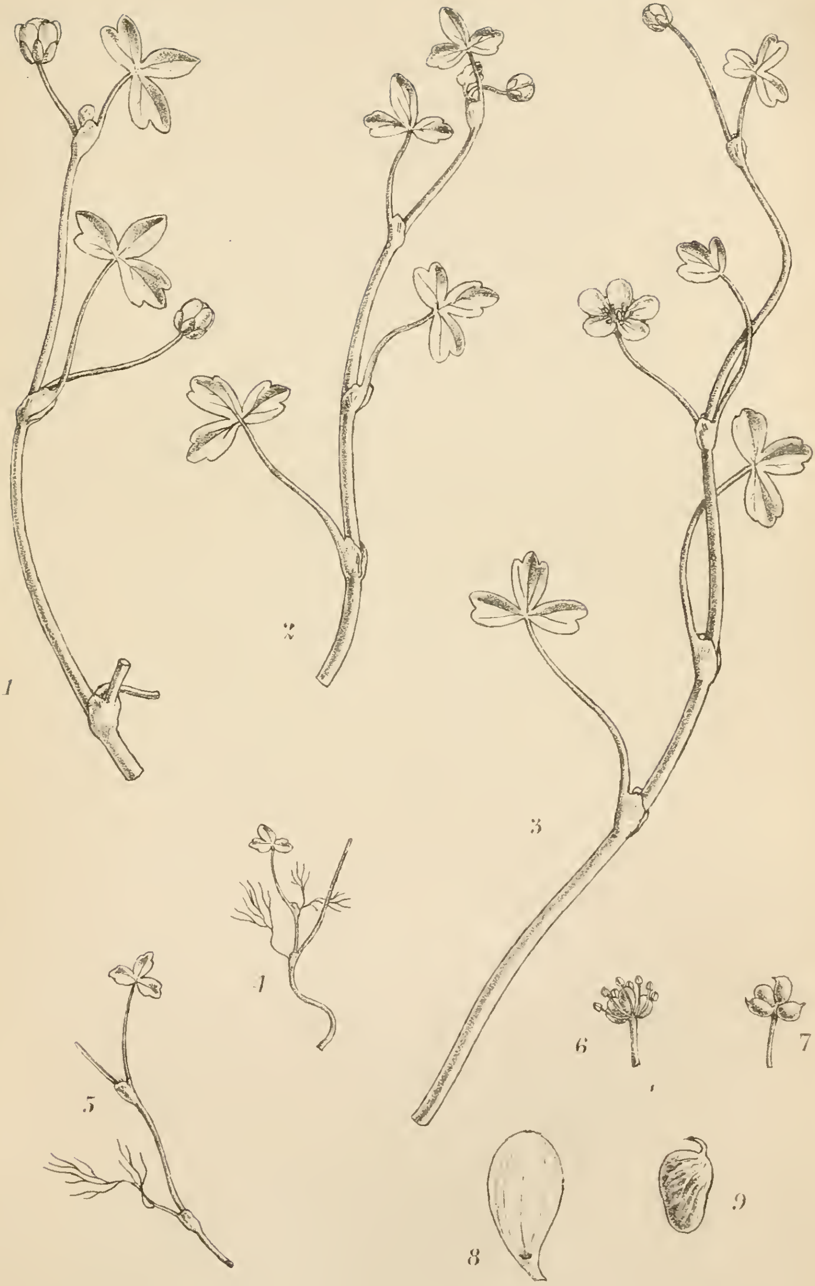
R. tripartitus, Dubourg d'Iisigny in Catalogue des Plantes spont. de l'Arrond de Vire, séance publique de la Soc. Linnéenne de Normandie, 1836; non De Cand. (1808). *R. Lenormandi*, F. Schultz in Flora, vol. xx. Bd. ii. p. 726 (1837). *R. reniformis*, N. Desportes Fl. Sarth. 3 (1838) ex Boreau, non Wall. List. n. 4709 (1828). *R. hederaceus β. grandiflorus*, Bab. Man. Brit. Bot. ed. i. (1843). *Batrachium Lenormandi*, Fr. Sum. Veg. Scand. vol. i. p. 139 (1846) ex Nyman. *R. cœnosus*, Bab. Man. Brit. Bot. ed. 3. p. 7 (1851).—Fig.—Eng. Bot. Suppl. t. 2930. Godr. Essai. f. 2. Cosson and Germ. Atl. t. i. f. 3, 4.

Occurs in Scotland, England, Wales, Ireland (teste Moore and More), France, etc. This form approaches both *homœophyllus* and *intermedius*, and were it not for the absence of submersed leaves would sometimes even remind one of small states of *floribundus.*

5. HOMŒOPHYLLUS.

R. omoiophyllus, Tenore, Fl. Neapol. vol. iv. p. 338 (1830). *R. cœnosus*, Guss. Fl. Sic. Prodr. Suppl. p. 187 (1834), non Bab. (1851). *Batrachium cœnosum*, Dumort. Florul. Belg. (1827).

Tab. 114.



W. G. Smith lith.

Mintern Bros imp.

Occurs in Scotland, England, France, Germany, Italy, Sicily, Spain, Portugal (teste Machado), Algeria (Cosson! state approaching *Lenormandi*), (Switzerland, Holland, Denmark, Belgium, Mid-Russia, and Transylvania, teste Nyman). Probably a floating state of *hederæfolius*.

6. HEDERÆFOLIUS.

R. hederaceus, Biria, Hist. Renonc. p. 33 (1811), Brébiss. Fl. Normand. ed. iii. p. 7 (1859). *R. hederaceus*, var. b. *erectus*, Brébiss. l. c. (an upright state, reported from Vire, France). *Batrachium hederaceum*, Dumort. Florul. Belg. (1827) ex Nyman.—Fig.—Curt. Fl. Lond. vol. i. t. 95.

Occurs in Norway, Sweden, Denmark, Holland, Scotland, England, Wales, Ireland, Belgium, France, Germany (Mid-Russia and Transylvania, teste Nyman), Spain, Portugal, Algeria, Newfoundland, Rocky Mountains (state with larger flowers and more numerous stamens than in the type, approaching *Lenormandi*). Leaves sometimes opposite. Salisbury's name *hederæfolius* I have used for this form, though he doubtless meant it to be a mere synonym of *hederaceus*.

7. INTERMEDIUS.

R. intermedius, Knaf in Flora, vol. xxix. p. 289 (1846), non Poir. *Batrachium intermedium*, Nyman, Syll. Fl. Europ. p. 175 (1854–5). *R. tripartitus*, Auct. Brit.—Fig.—Eng. Bot. Supp. t. 2946.

Occurs in England, Wales (teste Babington), France, Bohemia, Portugal. Leaves sometimes opposite. In some states very like *Lenormandi*, but differs by presence of hairs on the receptacle; differs also from *tripartitus* by the absence of submersed leaves, by its less deeply divided floating leaves and usually by a different habit.

R. aquatilis, Linn. Sp. Pl. 781 (1753), non Hook. f. et T. Thoms. (1855), nec Godr. (1839). *R. capillaris*, Gaterau in Pl. Montauban, p. 102 (1789). Forms 8–35.

Linnæus gave four varieties of this, which are mentioned below under the names *heterophyllus*, *circinatus*, *pectinatus*, and *fluitans*. De Lamarck divided it into two species, *aquaticus* and *fluitans*; Brotero, in a different manner, into two, *heterophyllus* and *pantothrix*; and various later writers into several others. The petals are occasionally more than five in number, as, for example, in *penicillatus*, *floribundus*, *Drouetii*, and *fluitans*, though in all the forms five is the normal number.

R. aquaticus, Lam. Fl. Fr. vol. iii. p. 184 (1778), non Benth. (1858). *R. aquatilis*, α. β. γ. L. (1753). *R. aquatilis*, Willd. Sp. pl. 2. 1332 (1779). Forms 8–34.

This can usually be separated from *fluitans* by the slenderer or shorter segments of the submersed leaves (which are nearly always present) and by the hairy receptacle; but neither of these characters is quite trustworthy. When the petals are equal to or shorter than the sepals, the state is called by Schlechtendal in Animadv. Ran. p. 10 (1819) *R. aquatilis* b. *parviflorus*, after a small-flowered variety of *R. aquatilis*, L., first noticed by Catherine Ellen Dörrien in Nas. p. 196 (1777). (See note under *rhipiphyllus*, n. 17). I have seen an example of this from the neighbourhood of Leipzig.

R. heterophyllus, Weber in Wiggers, Prim. Fl. Holsat. p. 42 (1780). *R. aquatilis*, α. Linn. Sp. Pl. 781 (1753). *R. diversifolius*, Gilibert Fl. Lithuan. vol. v. p. 261 (1782), non Boiss. et Ky.

Pl. Exs. 1859. *R. aquatilis*, *a. diversifolius*, Hagen, Ranunc. Pruss. (1783) in Ludw. Del. Opusc. p. 587 (1790). *R. aquatilis*, Thuill. Fl. Par. ed. ii. p. 278 (1799), Naccari Fl. Venet. vol. iii. p. 101. n. 510 (1827). *R. hydrocharis*, A. *heterophyllus*, Spenn. Fl. Frib. p. 1007 (1829). *Batrachium aquatile*, *β. heterophyllum*, Spach Hist. Nat. Veg. vol. vii. p. 200 (1839). BATRACHIUM, sect. HETEROPHYLLEÆ, Dumort. Monogr. (1863). *B. luteolum*, Revel, Rech. Bot. Sud-ouest France (1865); Bull. Soc. Bot. France, vol. xii. Rev. Bibl. p. 258 (1865), is a form having the leaves (all) reniform subrotundo-orbicular, 3–5-fid, with crenate lobes, flowers small, carpels numerous, style sublateral, receptacle setose. When in nearly dry places the stem is procumbent and the floating leaves are subreniform, tripartite, with more or less divided lobes, and the submersed leaves multifid with linear segments, the state is *R. aquatilis*, C. *anomalus*, Liljebl. Sw. Fl. p. 229, ex Schlechtendal; *R. aquatilis*, *a. heterophyllus*, *cœnosus*, Moris Fl. Sard. vol. i. p. 26 (1837); *R. aquatilis*, *γ. terrestris*, Godr. When the floating leaves tend to become capillary, as in Biria, Hist. Renonc. t. 1. f. 27, the state is called *radiatus* [see Boreau, Fl. Cent. Fr. ed. 3. vol. ii. p. 11 (1857)] or *fissifolius* [see Schlecht. Berol. Fl. vol. i. p. 303 (1823)]. When submersed leaves are entirely absent (a very rare occurrence in the *aquatilis* group), the state is called *isophyllus* [see Fries, Sum. Veg. Scand. vol. i. p. 26 (1846)]; and when this takes place in shallow places which subsequently become dry, so that the lower leaves wither and the upper only remain, the state is *R. aquatilis a. anomalus*, Retz ex Schlechtendal. *Batrachium heterophyllum*, var. *crassicaulis*, Fries, Sum. Veg. Scand. vol. i. p. 140 (1846) is a succulent state with swelled stem, large flowers, many stamens, and about a hundred glabrate carpels arranged in a large head; perhaps a state of *Baudotii*. Forms 8–19.

8. TRIPARTITUS.

R. tripartitus, De Cand. Ic. Pl. Gall. Rar. p. 15. t. 49 (1808) excl. Syn. Thor., non Auct. Brit. nec Nolte (1828), nec Fl. Dan. t. 1993. *R. tripartitus*, *a. micranthus*, De Cand. Regn. Veg. Syst. Nat. vol. i. p. 234 (1818). *Batrachium tripartitum*, S. F. Gray, Nat. Arr. Br. pl. 2. 721 (1821). *R. hydrocharis*, A. *heterophyllus*, *γ. tripartitus*, Spenn. Fl. Frib. (1829).—Fig.—Sturm, Deutschl. Fl. Hf. 67; Reichb. Fl. Germ. 3. 2; Godr. Essai, f. 3; Cosson and Germ. Atl. t. 1. f. 7, 8.

Occurs in France, Germany, Portugal, Spain (Willkomm! a weak state with long and slender petioles and without submersed leaves, and with the floating leaves nearly tripartite, and also with the receptacle setose and sometimes conical; approaches *intermedius*, *Lobbii*, and *tenellus*, as well as *tripartitus*). Another plant in flower from Portugal (Welwitsch! Fl. Lusit. Exs. 409) without floating leaves and resembling *confervoides*, is *R. tripartitus*, *β. submersus*, Godr. in Gren. and Godr. Fl. Fr. vol. i. p. 20 (1848). Fries states in Sum. Veg. Scand. vol. i. p. 140 (1846), that the presence of floating leaves is necessary for the production of flowers in *R. tripartitus*, De Cand., in consequence of the peduncles springing only from the axils of the floating leaves.

R. aquatilis, A. *heterophyllus*, *a. lejospermus*, Wallr. Sched. Crit. 282 (1822). *R. Petiveri*, Koch, Syn. Fl. Germ. et

Helvet. ed. 2. p. 13 (1843). Forms 9–12.—Fig.—Cosson and Germ. Atl. t. 1. f. 5, 6.

R. Petiveri, *a. minor*, Koch, l. c. *R. Petiveri*, Koch in Sturm. Deutschl. Fl. Hf. 82 fig. (1840). Forms 9–11.

9. HOLOLEUCUS.

R. ololeucos, Lloyd, Fl. Lorr. p. 3 (1844). *Batrachium ololeucos*, Van den Bosch, Fl. Bat. Prodr. 6 (1850).

Occurs in Belgium, France, Spain, Portugal (teste Machado), Holland (in Fl. Bat. Prodr. p. 6). A Portuguese specimen (Welwitsch! Fl. Lusit. Exs. 906, 6000 ft. alt.) probably belongs to this form.

Intermediate between *tripartitus* (than which the flowers are larger) and *confusus*. The only good character to distinguish it is the absence of the yellow colour from the base of the petals. The stipules are wide, spreading, and very shortly adnate to the petioles, and the carpels are glabrous. It has not yet been noticed in Britain, but ought to be looked for.

Batrachium obtusiflorum, S. F. Gray (1821). *R. tripartitus*, *β. obtusiflorus*, De Cand. (1818). *R. Baudotii*, Syme in Sowerb. Eng. Bot. ed. 3. p. 24 (1863). Forms 10, 11.

A state with quite glabrous receptacle was noticed near St. Petersburg by Ruprecht, which he called var. *psilocarpa*, Fl. Ingr. p. 22 (1860).

10. CONFUSUS.

R. tripartitus, Nolte Novit. Fl. Holsat. p. 51 (1828). *R. confusus*, Godr. in Gren. and Godr. Fl. Fr. vol. i. p. 22 (1848). *Batrachium confusum*, F. Schultz. *R. Kochii*, Beurl. Bot. Not. 1852, p. 156. *R. Baudotii*, *β. confusus*, Syme in Sowerb. Eng. Bot. ed. 3. p. 25. t. 23 (1863). *Batrachium tripartitum*, Schur, En. Pl. Transsilv. 12 (1866). —Fig.—Fl. Dan. t. 1993.

Occurs in Sweden, Denmark, Scotland (teste Syme), England, Wales, France, Germany, Holstein, Sleswig, Switzerland, Sicily (Parlatore!), Algeria (?). Portions without floating leaves resemble *salsuginosus* or *trichophyllus*. States with large flowers approach *R. peltatus*, Schrank; other states in brackish water cannot be separated from *Baudotii*.

11. BAUDOTII.

R. Baudotii, Godr. Essai, f. 4 (1839); Eng. Bot. Suppl. t. 2966. *Batrachium Baudotii*, Van den Bosch, Fl. Batav. Prodr. p. 7 (1850). *R. Baudotii*, *a. vulgaris*, Syme in Sowb. Eng. Bot. ed. 3. p. 25 (1863).

Occurs in Scandinavia (?), Scotland, England, Wales, Ireland (teste Moore and More), France, Holland, Prussia, Spain, Portugal (teste Machado), Algeria. I have a state between this and *R. peltatus*, Schrank., from Northumberland. This plant when it is deprived of its floating leaves resembles or becomes *marinus*. In England, at least, *Baudotii* is marine or found only in brackish water.

12. TRIPHYLLUS.

R. triphyllos, Wallr. in Linnæa, vol. xiv. p. 584 (1840). *R. Petiveri*, *β. major*, Koch, Syn. Fl. Germ. et Helvet. ed. ii. p. 13 (1843). *R. heterophyllus*, Fries (part) (1845). *Batrachium heterophyllum*, Fries (part) (1846). *R. aquatilis*, var. *δ. tripartitus*, Koch in Sturm. Deutschl. Fl. H. p. 67. f. (1835). *R. Friesii*, Beurl. Botan. Notis. 1852, p. 156, non Hartm.

[ERRATUM.—In the chronological list, p. 48, insert,—

1865. *luteolum*, Revel, Rech. Bot. Sud-ouest France.—La Teste, S.W. France.]

(*To be continued.*)

NOTES ON THE DISTRIBUTION OF ALGÆ.

By G. Dickie, A.M., M.D.

(*Read at the Meeting of the Botanical Society of Edinburgh, Jan. 12th*, 1871.)

The result of dredging near the "Maiden Rocks" in relation to range in depth of Algæ, formed the subject of a paper to the Society in 1869; having some years before made a passage in the lighthouse tender from Larne, the nearest port, I have thought that notes of the Algæ found on them might deserve to be recorded, especially when contrasted with those of the neighbouring shore. The "Maidens" are about six to seven miles from the Antrim coast, they are in close proximity, of small extent, and each mainly occupied by lighthouse-buildings, presenting but few crevices where land plants can grow, of which I only found three, viz. *Matricaria inodora*, var. β. *maritima*, and two species of *Atriplex*. The two small islands in question rise abruptly, having deep water near them; they are in fact the rugged tops of a submerged mass of basalt.

The visit was made about the end of June (a month or two later would have been more favourable), the time allowed was limited; I, however, collected every seaweed that could be seen, and all were kept separate in my herbarium.

The following is a list:—

Laminariaceæ.

Alaria esculenta, Lyngb.
Laminaria digitata, Lamour.
Chorda lomentaria, Lyngb.

Ectocarpaceæ.

Ectocarpus sphærophorus, Carm.
E. littoralis, Lyngb.

Rhodomelaceæ.

Odonthalia dentata, Lyngb.
Polysiphonia fastigiata, Grev.
P. urceolata, Grev.
P. Brodiæi, Grev.

Laurenciaceæ.

Chylocladia articulata, Grev.

Squamarieæ.

Hildenbrantia rubra, Harv.

Corallinaceæ.

Melobesia pustulata, Lam.

Delesseriaceæ.

Delesseria sinuosa, Lamour.*
D. alata, Lamour.
Nitophyllum laceratum, Grev.

Rhodymeniaceæ.

Rhodymenia palmata, Grev.
Hydrolapathum sanguineum, Stackh.†

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* This is the species which was dredged in 70–80 fathoms, near the "Maidens," as reported in a former communication.

† *Wormskioldia* having been applied to a genus of flowering plants by De

Cryptonemiaceæ.

Gigartina mamillosa, J. Ag.
Iridæa edulis, Bory.

Ceramiaceæ.

Ptilota sericea, Ktz.
Ceramium rubrum, Ag.
C. acanthonotum, Carm.
Griffithsia setacea, Ag.
Callithamnion Arbuscula, Lyngb.

Siphonaceæ.

Bryopsis plumosa, Ag.

Confervaceæ.

Cladophora arcta, Ktz.

Ulvaceæ.

Enteromorpha compressa, Grev.
Porphyra laciniata, Ag.
Bangia fusco-purpurea, Lyngb.
B. ciliaris, Carm. Growing upon *Ectocarpus sphærophorus*.

Rivulariaceæ.

Calothrix scopulorum, Ag.

Diatomaceæ.

Synedra fulgens, Sm.
Isthmia nervosa, Kütz.

This list is very meagre compared with the species found on the nearest coast, where the prevailing rock is hard chalk; the following are among the more remarkable of these,—most of them are not merely plentiful, but notable for their size:*—*Laminaria phyllitis*, *L. Fascia*, *Dictyota dichotoma*, *Stilophora rhizodes*, *Punctaria latifolia*, *Asperococcus Turneri*, *Mesogloia vermicularis*, *Polysiphonia formosa*, *P. violacea*, *P. elongella*, *P. atropurpurea*, *P. affinis*, *P. parasitica*, *Chylocladia ovalis*, *C. kaliformis*, *Delesseria Hypoglossum*, *Nitophyllum punctatum*, *N. Bonnemaisoni*, *N. Gmelini*, *Rhodymenia ciliata*, *Sphærococcus coronopifolius*, *Chondrus Norvegicus*, *Halymenia ligulata*, *Scinaia furcellata*, *Kallymenia reniformis*, *K. Dubyi*, *Gloiosiphonia capillaris*, *Callithamnion Plumula*, *C. floridulum*, *C. cruciatum*, etc. etc.

The species already mentioned as found on the "Maidens" are generally very dwarf; they also grow on the nearest coast, where they attain much greater size. Hard chalk being the prevalent rock in the one case, and rugged basalt the habitat in the other, the contrast as to size, as well as number, might be attributed to difference in chemical composition; the small extent of surface at the "Maiden Rocks," freely exposed to all the storms of the Channel, and therefore unfavourable to the growth of many species, is the most probable cause; on the Antrim coast sheltered pools and crevices abound, and these day after day in summer, during ebb,

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Candolle in 1824, S. O. Gray, in a popular account of British Algæ, has given the name *Maugeria*, in honour of a lady collector; I follow Le Jolis's 'Algæ of Cherbourg,' in adopting Stackhouse's name, Tentamen, etc., 1809.

* See Memoir of late Professor Harvey, p. 220, in a letter he alludes to the size of *Rhodymenia laciniata*, Grev.; a specimen from coast of Antrim large enough to cover an ordinary round drawing-room table.

receive the full influence of the sun's rays, which certainly affects the mean temperature.

The Algæ of the "Maidens," with few exceptions, have a wide range in latitude and longitude on the British and Irish coasts; *Alaria* and *Odonthalia* are chiefly confined to the Northern shores.

As to the relation between the kind of rock and the distribution of Algæ, it may be sufficient to observe that the more abundant and widely diffused are found indifferently on rocks of the most opposite character; that habitat does, however, modify the composition of at least one common species seems proved by the following instance. When passing the coast at Bay of Nigg, near Aberdeen, in September last (1870), I observed an iron chain newly brought to shore which had been during six months in four to five fathoms water, it was completely covered by the *Rhodymenia palmata;* attached to this chain there was a piece of hempen rope, about three feet in length, which had a crop of *Polysiphonia Brodiæi;* these were the only species, and each was strictly confined to the chain in the one case, and to the rope in the other. The *Polysiphonia* was of good size, nearly as large as it occurs on the neighbouring rocks; the *Rhodymenia* was dwarf, two or three inches, paler and more delicate than usual; of the last I collected sufficient for analysis, and am indebted for a report to my friend and former pupil, J. C. Brown, D.Sc. Lond., and Lecturer on Toxicology, Medical School, Liverpool; he was very careful to avoid any source of fallacy.

Rhodymenia from iron chain,
Iron = 0·0112 per cent. of dry plant,
or 0·235 per cent. of the ashes.
Rhodymenia from granite rocks, Bay of Nigg,
Iron = 0·0035 per cent of the dry plant.
or 0·056 per cent. of the ashes.

It can scarcely be that in this case each plant "selected" its special habitat; *Rhodymenia* is a common perennial species, the *Polysiphonia* appears only toward the end of summer. The fishermen at the salmon station assured me that chain and rope were quite clean when put into the sea; it is probable that the piece of rope had been in some way bedded in sand or mud, which having been, towards the end of the season, washed away by currents, the *Polysiphonia* grew on it, the chain having been previously covered with a thick crop of the *Rhodymenia.*

A SUPPLEMENT TO THE 'FLORA VECTENSIS.'

By Alexander G. More, F.L.S., M.R.I.A.

During the fourteen years which have elapsed since the publication, in 1856, of Dr. Bromfield's 'Flora Vectensis,' several plants have been added to the list, and the discovery of many new localities for rare species has rendered the botany of the Isle of Wight much better known. The present seems a good opportunity for bringing together various contributions received from other botanists, which, joined to the results of my own observations during seven years' residence at Bembridge, from 1856 to 1862, will serve, in some measure, as a continuation of the successful labours of the late Dr. Bromfield.

In drawing up the following list, I gladly acknowledge the great assistance which I have, on many occasions, received from my friends Messrs. Babington, Boswell Syme, Watson, Baker, and others, who, in cases where I have felt any doubt, have continually given me the advantage of their opinion.

The late Mr. A. J. Hambrough, of Steephill, Mr. F. Stratton, Mr. J. Pristo, and others of my friends have supplied a large number of localities. Mr. Stratton has also extracted from a copy of the 'Flora Vectensis' some memoranda left by the former owner, the late Major H. Smith, whose observations, however, must be received with some degree of reserve. Dr. G. R. Tate has kindly placed at my disposal a series of notes made during his stay at Freshwater, from 1865 to 1868, and Mr. J. G. Baker has favoured me with his observations on Vectensian Roses and *Rubi*, made in 1868.

A few of the following plants are included in a "Catalogue of the Plants of the Isle of Wight," published by me in the 'Annual Report for 1859 of the Isle of Wight Philosophical Society,' and intended to serve as an index to the herbarium of Dr. Bromfield, which is preserved at Ryde, in the rooms of the Society. Some of the localities and plants have also been noticed by myself in the botanical portion of the Appendix to 'A New Guide to the Isle of Wight,' by the Rev. E. Venables (1860), or from year to year in the 'Phytologist,' the 'Reports of the Botanical Exchange Club,' or the 'Journal of Botany,' but many, especially of the critical forms, have not yet been recorded.

It is to be remembered that the localities here given do not pretend to show the complete range in the Isle of Wight of any of the plants, but are strictly supplementary to those given by Dr. Bromfield in his 'Flora Vectensis' (1856), and in his "Catalogue of the Plants growing wild in Hampshire," published in the 'Phytologist,' o.s. vol. iii. and iv. (1847–1851).

The marks of naturalization are used, as I have employed them elsewhere, the single dagger † for cases of slight suspicion, for plants which now appear native, but were possibly introduced. The double dagger ‡ for plants probably introduced, including nearly all the regular colonists or cornfield weeds, which spring up, year after year, in cultivated land. The asterisk * is used for plants certainly introduced. Within the brackets [] are included plants which are nowhere permanently established, but occur occasionally as escapes from cultivation, or by some other accident, without being self-supporting, also numerous species which have been evidently planted, and have scarcely yet strayed beyond the limits of gardens, houses, or intentional cultivation, and the extinct plants. The mark ! is employed in a few cases where I have examined a dried specimen, though I have not gathered the plant.

[*Thalictrum flavum*, L. Probably extinct; I could not find it in 1863, and Mr. F. Stratton has also searched unsuccessfully at Wootton Creek. "Formerly in Lee Meadows, E. M." (Major Smith.)]

‡*Adonis autumnalis*, L. "Fields at Wroxall and Lowcombe" (Major Smith). Flowers in July and August, hardly so early as May. Abundant in the upper cornfields above Steephill and St. Lawrence; appears well established as a weed among the crops.

Ranunculus trichophyllus, Chaix. Pond in a meadow nearly opposite the end of the "Spencer Road," Ryde (1856), also in the pool south of

Cothey Bottom Copse, given in the 'Flora Vectensis' as a locality for "*R. aquatilis*, var. *pantothrix*," this being doubtless the same plant which is called "*R. fluitans?*" by Dr. Bromfield, in the 'Phytologist,' vol. iii. p. 290; but the true *R. fluitans*, Sibth., has not been found in the Isle of Wight.

R. Drouetii, Schultz. Ditches in the marsh on north side of Brading Harbour, where the floating leaves are sparingly produced (1856). Ditches in the marsh at Freshwater Gate! (A. J. Hambrough).

R. heterophyllus, Sibth. In several ponds near Bembridge, etc., but not common in the Isle of Wight. A form without floating leaves occurs in the marsh ditches on the north side of Brading Harbour. Specimens of this are preserved in Dr. Bromfield's herbarium under the name of "*R. circinatus*," Sibth., which has not yet been found.

R. Baudotii, Godr. Ditches on the north side of Brading Harbour, abundantly (1856); also in a pond between the harbour and Yaverland Farm. In Saltern's Marsh between Sea View and Springvale.

R. peltatus, Fries. Common. By this name I understand a large-flowered and luxuriant plant, which is abundant in the marsh ditches near Sandown, and in many other parts of the island. The early floating leaves are often nearly peltate, with five rounded sub-entire lobes (var. *quinquelobus*, Koch), but the leaves produced later in the season are reniform, often nearly truncate at the base, with a tendency in this case to become three-lobed, the central lobe being separated from the others, still it is rounded at the margin, and nearly always entire. This is probably the variety named "*truncatus*" in the French Floras of Cherbourg and Dinan, and I believe it is also this plant which, in rapid streams, becomes *R. pseudo-fluitans*, in which the truncate-reniform shape of the floating leaves still continues, but their segments become more acute, and are often drawn out at the tip into long points.

From *R. peltatus* I do not feel any confidence in separating *R. floribundus*, though I believe the name may fairly be applied to a plant with the peltate floating leaves more deeply divided, and their segments more notched, and which I have gathered, here and there, in ponds and ditches in various parts of the Isle of Wight. It is to be noted that, as in others of this section, the early flowers of *R. peltatus* are much larger, and the petals more full and rounded, than those which are produced later in the season.

R. Lenormandi, Schultz. Plentiful on several parts of Pan Common, especially at the western end. In a ditch close to Alverstone Lynch. Ditches in the Wilderness at Rookley, and near Lashmere Pond. Far less common with us than *R. hederaceus*, and apparently restricted to a sandy soil.

R. hederaceus, L. At Hillways, Bembridge. On Pan Common. At Luccombe, near the Chine. Lashmere Pond. Freshwater Gate, etc. Pan, near Newport (F. Stratton).

R. Flammula, var. *pseudo-reptans*, Syme. In boggy ground at Freshwater, Rookley, Blackwater, etc. (F. Stratton). This is very different in appearance from the plant which grows on the shores of mountain lakes, and is probably no more than a procumbent form of growth assumed in autumn by *R. Flammula*.

R. Ficaria, L. Near Bembridge, I have sometimes found root-leaves with rounded and overlapping lobes, but the outer phyllodes are not half as wide as the sheaths of the leaves. This therefore is not quite the *Ficaria incumbens* of foreign writers, though I believe it the var. *incumbens* of Syme's 'English Botany.'

R. acris, L., var. *R. Boræanus*, Jord. Our Isle of Wight plant appears to belong exclusively to the form "*R. tomophyllus*," of Jordan ('Diagnoses,' p. 71), differing from typical *R. Boræanus* in having the base of the stem and the petioles of the radical leaves clothed with spreading yellow hairs. I have not met with *R. vulgatus*, Jord.

R. hirsutus, Curt. Frequent in damp meadows, especially near the sea; occurs also on village greens, as at Nettlestone. By no means exclusively agrestal in the Isle of Wight.

Caltha palustris, L. So far as I know, only the variety "*vulgaris*" occurs.

**Helleborus viridis*, L. A large patch in Woodhouse Copse, near Alverstone (J. Pristo); the remains, I fear, of former cultivation.

‡*Helleborus fœtidus*, L. Probably not indigenous at St. Lawrence, where I have only seen it in and near to what was formerly a shrubbery or pleasure ground, and which, though now sufficiently wild in appearance, still produces the cut-leaved Elder and a foreign species of *Hypericum*. Mr. Stratton has observed one or two plants in a still more suspicious station, in a hazel copse close to the orchard at Apes Down Farm.

Aquilegia vulgaris, L. In a wood south-west of Colwell; and by the side of the Yar, one mile south of Yarmouth, sparingly in both places, but truly wild (J. G. Baker). Formerly at Alverstone, on land that had been cultivated many years ago (J. Pristo).

[*Delphinium Ajacis*, L. The two specimens of "*D. Consolida*," mentioned in 'Flora Vectensis' as gathered by Mr. Hambrough and Miss Kirkpatrick, both have a pubescent capsule; but the plant has no claim to be considered established in our cornfields.]

**Berberis vulgaris*, L. A few bushes in a hedge between Furzy Goldens and More Green, Freshwater (H. C. Watson). Probably planted here, as in the other localities given in 'Flora Vectensis.'

‡*Papaver dubium* (*Lamottei*, Bor.). Sandy cornfields above Red Cliff, Sandown Bay; in corn near Newchurch; chalk-pit, south-east of Carisbrook Castle. By no means common.

‡*P. Lecoquii*, Lamotte. Cultivated fields above the landslip at Luccombe (Rev. W. W. Newbould, 1858). A single plant in a sandy turnip-field at Bembridge. On a heap of chalky rubbish by the roadside between Lake and Shanklin. Frequent in garden ground at Ventnor and Bonchurch. Near Gatcombe and Carisbrooke (F. Stratton). *P. Lecoquii* shows a decided preference for a calcareous soil, as *P. Lamottei* does for sand. Both plants are very local or scarce.

‡*Papaver Rhœas*, var. *strigosum*, Bönninghausen. Near Yaverland; near Tyne House, Bembridge; at Kerne, Ashey, and Nunwell; but in all stations sparingly. This is not an ambiguous or intermediate form, but simply *P. Rhœas* with adpressed hairs.

†*Fumaria pallidiflora*, Jord. In hedges and on rough bushy banks about Bonchurch and Ventnor, but in no great abundance (1861). In a hedge at Brightstone, where Mr. Stratton also has gathered it. Mr. Stratton has kindly shown me the specimens he named *F. Boræi* ('Journal of Botany,' VII. p. 315). I cannot see how they differ, except in

colour, from typical *F. pallidiflora*, gathered at the same time. In the series occur some specimens with perfectly white flowers, and others more or less tinged with purple, and the curvature of the pedicels is very variable even in the same plant. In any case, the supposed *F. Boræi* from Brightstone differs widely from the plant given as *F. Boræi* in Billot's 'Exsiccata.' I may add that Dr. Boswell Syme also refers Mr. Stratton's specimens to *F. pallidiflora*.

†*F. confusa*, Jord. On the shore west of Ryde; hedge at Alverstone; garden of the Vicarage at Carisbrooke; Appuldurcombe! (A. J. Hambrough). By far the most frequent of the capreolate *Fumariæ* in the island.

†*F. muralis*, Sond. Hedge near Freshwater Gate, sparingly, June, 1862. The plant gathered here agrees closely with Mr. Watson's Azorean specimens.

Obs. *F. micrantha*, Lag. Dr. G. R. Tate reports having found a single specimen, which was not preserved, in waste ground near Yarmouth, in 1865. Dr. Bell Salter recorded, I believe inadvertently, *F. micrantha* as found by himself flowering in January, 1855, near Ryde (Bot. Soc. Edin. Proc. 1855, p. 18). Dr. Bromfield speaks of another specimen found by Dr. Salter as either *parviflora* or *micrantha*. But I fear this species cannot be accepted as an Isle of Wight plant.

(*To be continued.*)

SHORT NOTES AND QUERIES.

Wolffia in Blossom.—Mr. Henry Gillman, in the 'American Naturalist' for January, says,—"I have just found (August 28th, 1870) the *Wolffia columbiana*, Karsten, flowering abundantly in a pool at Sandwich, Ontario, on the Detroit river. I discovered this station for it more than a year ago, but hitherto have failed to find the flowers till now. Untold millions of these tiny plants covered the surface of the water, hiding it completely, and lying *en masse* at least three-quarters of an inch thick. I found it also (though not fertile) some miles higher up the river, at Connor's Creek, Michigan, but nowhere else along the shores. Though Gray says 'flowers and fruit not seen,' it has, I think, been found once in flower in the Catskills. The delicate white flowers disappear soon after taking it from the water, but on placing some next day in my aquarium the little plants at once 'righted themselves,' and the flowers almost instantly reappeared, expanding fresh as ever from the centre of the frond. Last year, in the same pool, it was quite abundant, growing with *Lemna minor*, L., which was, however, largely in the majority. Now I find the *Wolffia* has almost taken possession of the pool, driving out the *Lemna*, which is 'few and far between,' and of a sickly and degraded type." The European (and British) species, *W. arrhiza*, Wimm., has, I believe, been seen in flower hitherto only in West Africa by Dr. Welwitsch, and his specimens were described and figured by Hegelmaier in this Journal, Vol. III. p. 113, and tab. 29. A hint here for those with aquaria who try to flower this tiny plant—stint it of water, and expose it to heat. Perhaps growing it on flannel kept constantly wet with warm water, and exposed to the sun, might cause the reproductive energies to overcome the vegetative ones.—Henry Trimen.

Plants of the Northern Suburbs of London, 1870.—The vegetation of the outskirts of London includes a curious collection of waifs and strays. It is often exceedingly puzzling to trace their source, though sometimes the clue seems more obvious. This was the case with a new road near South End Green, Hampstead, which had been made but never used. The flint ballast with which it had been covered was almost hidden by the rank-growing plants, amongst which were some large and conspicuous bushy individuals of *Atriplex marina*, L. Although this has been recorded for Middlesex by Petiver (see 'Flora of Middlesex,' p. 236), it is usually so exclusively a littoral species that it makes the presumption very strong that the road had been made with shore-ballast. The Rev. W. M. Hind's locality for *A. Babingtonii*, Woods, between Kilburn and Kensal Green (*vide* 'Flora of Middlesex,' p. 238), was on sea-gravel. With *A. marina*, L., there was a curious assemblage of plants. *Helianthus annuus*, L.; *Linaria minor*, Desf., abundant and of a large size (this has otherwise seemed quite confined in Middlesex to the western half); *Serrafalcus secalinus*, Bab.; *S. arvensis*, Godr.; *Lolium temulentum*, L. A very handsome *Polygonum* seems to me to be the true *P. Pensylvanicum*, L., though Mr. Watson, to whom I submitted a perhaps hardly sufficient scrap, prefers to call it *P. lapathifolium*. The colour of the perianth, a bright deep pink, gave the plant a gay appearance, suggesting an exaggerated state of *P. Persicaria*, from which, however, the abundantly glandular peduncles at once separate it. From *P. lapathifolium* it is easily distinguished by the *erect* racemes and *exserted* stamens; but, of course, if *P. Persicaria* and *P. lapathifolium* were united as is done by Mr. Bentham, the aggregate species would have to include *P. Pensylvanicum* also. Besides the irrepressible Atriplexes, Chenopodiums, and Polygonums of London suburbs, there was a tall-growing Chenopodium which, although very near *C. opulifolium*, Schrader, seems quite distinct from it, not having its rhomboidal obtuse, almost 3-lobed leaves. I am inclined to think it a more generalized type of that segregate of *C. album*, L., of which *C. candicans*, Lamk., is a rather abnormal state, certainly owing something of its habit to growing with cultivated crops. My plant was a good deal branched with long leafy branches, the leaves sparingly mealy, ovate-rhomboidal deeply-toothed, and exceeding the short axillary spikes of mealy flowers. Except that the foliage was greenish rather than glaucous-white, this agrees on the whole with the *C. album*, L., of Boreau (Fl. du Cent. de la Fr. 2078). The cornfield plant, which is the *C. album* of the Linnæan herbarium, has the toothing of the leaves shallower. Syme must have had some such plant as mine in view when he speaks of *candicans* reaching three feet in height, and being "rarely much branched." (E. B. vol. viii. p. 14.) *C. opulifolium* has a glaucous mealiness over a rather dark green surface, which comes out through it in drying. When growing, it has besides a peculiar *facies*, from the branches being mostly long and simple, and rather sparingly supplied with foliage. It is a plant making its way steadily into notice in the environs of London.

Chenopodiums sometimes present themselves in a very anomalous guise, and perhaps the most puzzling form I have come across is a state of *C. rubrum*, L., from near Cricklewood, Middlesex. I speculated at first on the possibility of this being a hybrid, but the plants were stunted and some of them injured, which may account for the peculiarities. The leaves, except a few slightly hastate with ascending lobes, are narrowly lanceolate, entire, and obtuse. The inflorescence, instead of forming dense leafy spikes, consists of small distant axillary cymes. Anything more unlike normal *C. rubrum* it is difficult to imagine.

A curious point about London introduced plants is the general prevalence of some one species during a single year, and its only sparing recurrence afterwards. In 1867 it was impossible to examine a waste bit of ground without coming sporadically upon *Setaria viridis*, Beauv. Last year *Lepidium ruderale*, L., seemed to be equally widely dispersed; within a short time I met with it at Highgate, Hampstead, and Teddington. It is not improbable that the grain used for feeding horses may each year, from market contingencies, come mainly from some one source. It seems quite likely that the horsebags of horses belonging to builders, cab-drivers, etc. may be a quite important means of distributing small exotic seeds in the environs of large towns.—W. T. THISELTON DYER.

BAROMETRIC PLANTS.—Linnæus, in his 'Flora Lapponica,' writing on *Trifolium repens* (274), states that is a common practice to predict (tanquam e Barometro) a coming storm by an inspection of this plant; for when the air is hot then the leaves hang down, whereas when there is moisture in the air the leaves are erect. This holds, he remarks, not only for the Trefoil, but also for most plants which have declining stamens ("*declinata*, deorsum inflexa instar Carinæ Naviculæ." Phil. Bot. 1770, p. 219; cf. Babington, sub voce). All the flowers, too, generally converge (connivent) when a shower is impending, as though they knew that the water would interfere with the fertilization of the plant, for when the fertilization has been effected no such convergency is exhibited ("quasi scientes aquam actum generationis turbare, coagulando vel diluendo farinam genitalem, cum actu generationis celebrato nulla conniventiæ signa ostendant"). He instances *Mimosa*, *Cassia*, *Bauhinia*, and their allies, as plants whose leaves converge every evening, even though there be no diminution of temperature. He concludes by asking what is the cause of this sensitiveness, and what change there is in the night air beyond the absence of light and heat? Dr. Hooker ('Student's Flora,' p. 79) states that the leaflets of *Oxalis* are pendulous at night, and often sensitive to light. Of *Anagallis arvensis* he remarks that the corolla opens in clear weather, and other plants besides those specified doubtless obey the same law. I would wish to repeat the question given above of the great botanist, in the hope that some reader of the Journal will be able to give an explanation of this curious phenomenon. Will the same explanation account for the perhaps more singular circumstance that the *Tragopogon pratensis*, L., closes at noon?—ROBERT TUCKER.

ACCENT IN BOTANICAL NAMES.—Mr. H. C. Watson, on pp. 3 and 69 of vol. i. (1847) of his 'Cybele Britannica,' gives "for the benefit of lady readers or others who are not familiar with Greek and Latin names," his pronunciation of the word "Cybele." Dictionaries are on Mr. Watson's side, yet one Virgil, no mean poet, required for his verse, not Cy̆b-ĕl-e but Cy̆b-ē-le. (See also Cyb. Brit. vol. iv. (1859), and 'Compendium,' preface, p. vi. (1870).) Now this word is one for which there are two pronunciations, I think, fairly allowable, if a Latin author may be cited as a good authority for his own language; but what amazes me and equally worries me is the great diversity in the position of the accent sanctioned by the usage of our foremost botanical writers. I go no further than these, for when we descend to the *minora sidera*, the differences are greatly multiplied. To prove my point I shall confine myself to the handbooks of Babington, fifth edition (B.), Hooker (H.), and Syme (S.), and Koch's 'Synopsis' (K.), taking some twenty plants and classifying my results. B. and S. agree in placing the accent on the penult in *Corydalis*, *Reseda* (K.), *Onobrychis* (K.), *Œnothera*, *Cuscuta*, *Asperugo*, *Obione*, *L. Martagon*, *A. Scorodoprasum*, etc., *Triglochin* (K.), *P. Hydropiper*, *Myrica* (K.); whilst in all these cases H. has the penult short, and K. is silent unless inserted as above. B. stands alone with accent on penult in *Koniga* (K. is silent), *Oxytropis*, *Doronicum* (K. silent), *C. Calcitrapa*, *Tulipa;* H. stands alone in accented penult of *Ornithopus*, *Comarum*, *Arnoseris*, *Arbutus* (forgetting "viride membra sub arbuto stratus"), *Phyllodoce* (K. silent), *P. Coronopus* (K. silent); S. alone shortens the penult in *Petroselinum*, *Urtica;* K. differs from the English writers in placing the accent on the penult in *Cephalanthera*, *Centaurea*, *Elatine;* H. and S. agree in lengthening the penult of *Lapsana;* and finally, in the case of *Radiola*, B. puts accent on *o*, H. K. on *i*, and S. on first syllable. Similar differences might be easily multiplied, and will readily occur to botanists. I think it would be a great advantage to have uniformity in this matter, and surely in the majority of the cases there is but one legitimate pronunciation, since the names are classical names and not anglicized forms.—ROBERT TUCKER.

DEFINITE AND INDEFINITE RHIZOMES.—The division of axes into definite and indefinite has a very important meaning with reference to the general habit of plants. Ordinarily speaking, that is to say, excepting only some wholly abnormal cases, when the terminal bud of an axis is developed into a flower, the growth of the axis is arrested, and further increase can only take place by the production of axillary buds; in such a case the axis is said to be *definite*. On the other hand, if the axis is never terminated by a flower or by anything but a growing bud, its continuous growth will of course proceed unchecked, and it is said to be *indefinite*. A general principle of this kind includes all that is stated in books about definite and indefinite rhizomes, branching, inflorescence. The only difference between a *corm* and a rootstock, or *rhizome*, consists in the fact that a corm is only of a year's duration, while a rootstock consists of a string of annual growths, which remain persistently attached. The only difference, for example, between the corm of *Arum maculatum* and the rhizome of Solomon's-seal lies in the persistence of the old axes in the latter case and their decay in the former. In both, the terminal bud of the subterranean horizontal axis turns up and produces an aerial development of inflorescence and leaves. The underground growth is carried on by the elongation, later in the year, of an axillary bud. This is the typical arrangement of a definite rhizome, and it is, perhaps, the most common. Excellent illustrations are supplied by the Bamboo and the genus *Iris*, as limited by Mr. Baker. According to fig. 130 in Henfrey's 'Elementary Course,' the Cowslip also has the flowering stem produced by a terminal bud. This would make it an instance of a definite rhizome, but this is almost certainly an error. Throughout the *Primulaceæ*, axillary inflorescence is the general rule, whether the main axis be erect, prostrate, or subterranean. The genus *Primula* is no exception, as is correctly pointed out with a figure in Dresser's 'Elements of Botany' (p. 70, fig. 72). Other examples of an indefinite rhizome are supplied by *Menyanthes trifoliata* and *Butomus umbellatus*. St. Hilaire ('Morphologie Végétale') gives *Scirpus palustris* and *multicaulis*, but it seems probable that the *Cyperaceæ* have all definite rhizomes as well as *Junceæ* and grasses. However, the underground economy of plants is an almost untouched subject in this country, although every collecting botanist might contribute something to our knowledge by the dissection and study of promising specimens.—W. T. Thiselton Dyer.

Can any botanist allow me the examination of a specimen of *Opegrapha calcarea*, Turn. (Eng. Bot. 1790), authenticated by Mr. Turner himself? None such exists in the Turner herbarium, Borrer herbarium, nor Sowerby herbarium at Kew and the British Museum.—W. A. Leighton.

Krempelhuber, in his 'Geschichte und Litteratur der Lichenologie,' vol. ii. p. 507, refers *Lichen terrestris minimus fuscus* of Ray's 'Synopsis,' 2nd ed. App. p. 331, to *Obryzum corniculatum*, Wall. Can any one who has examined Ray's herbarium in British Museum inform me whether this is correct, or are the specimens referable to *Leptogium palmatum*, Mut. (Eng. Bot. t. 1635)?—W. A. Leighton.

In Buddle's herbarium at the British Museum, vol. cxiv. fol. 8. n. 3, is an authentic specimen, labelled "*Lichen terrestris minimus fuscus*, Doody, in Appendix Ray Syn., Bobart Hist. Oxon. part 3. sect. 15. t. 7. f. 4. R. suppl. 48." It seems to be rather a state of *Leptogium sinuatum* than of *L. palmatum*. At all events the specimen is infertile, and certainly affords no warrant for the inference that it is *Obryzum corniculatum*, Wallr. —J. M. Crombie.

Reports.

NEW SPECIES OF PHANEROGAMOUS PLANTS PUBLISHED IN GREAT BRITAIN DURING THE YEAR 1870.

(*Continued from p.* 61.)

Drimia Burchellii, *Baker* (*Liliaceæ*); folia synanthia, carnoso-herbacea, lorato-lanceolata, glabra, 7–8 poll. longa, 1 poll. lata; scapus foliis subæquans; racemus 8–9 poll. longus, 1 poll. latus, 60–100-florus; pedicelli erecto-patentes, 2–3 lin. longi, bracteis linearibus subæquantes; perigonium 5–6 lin. longum, laciniis tubo triplo longioribus. C. B. S.—*Burchell*, 4769! *Zeyher*, 754!—*Appendix*, *Ref. Bot.* p. 2.

D. robusta, *Baker*; bulbo solitario hypogæo, foliis 6–9 erectis synanthiis lorato-lanceolatis tripedalibus glabris acutis, carnoso-herbaceis immaculatis, scapo erecto tereti stricto tripedali, racemo subpedali modice laxo, pedicellis floribus cernuis et bracteis lanceolato-acuminatis subæquantibus, perigonio extrorsum viridi intus purpureo tincto, laciniis ligulatis cucullatis tubo campanulato 3–4-plo longioribus, filamentis linearibus conniventibus laciniis paullo brevioribus, ovarii loculis multiovulatis.—Hab. Cape Colony, Hort. Saunders, from Mr. Cooper.—*Ref. Bot.* t. 190.

Drimiopsis minor, *Baker* (*Liliaceæ*); bulbo globoso tertio superiore

epigæo squamoso, foliis 2–3 cordato-ovatis bipollicaribus carnoso-herbaceis viridibus maculis saturatioribus notatis basi in petiolum canaliculatum lamina subæquante cite angustatis, scapis foliis excedentibus, floribus 12–20 dense subspicatis, perigonio 1½ lin. longo, laciniis ovato-rotundatis. —Hab. Natal, Hort. Saunders, from Mr. Cooper.—*Ref. Bot.* t. 192.

Enkyanthus japonicus, *Hook. f.* (*Ericaceæ*); ramulis subverticillatis, foliis deciduis membranaceis breviter petiolatis elliptico-ovatis obovatisve acutis argute serrulatis, corolla alba globosa, basi 5-saccata ore contracto lobis parvis revolutis, capsula angusta erecta.—Hab. Japan, Hort. Kew., introduced by Messrs. Standish.—*Bot. Mag.* t. 5822.

Epidendrum microcharis, *Reichb. f.* (*Orchideæ*) (aff. *E. pulchello*, A. Rich. et Gal.); radices velatæ, filiformes, subtilissime insculptæ; vaginæ fultientes, emarcidæ; pseudobulbi oblongo-pyriformes, purpureo-violacei, hinc impressi; folia gemina; laminæ optime articulatæ, linea callosa transversa albida sub lamina, lineari-ligulatæ, acutæ, chartaceo-pergameneæ, infra purpureo-violaceæ, supra violaceo marginatæ; racemus pauciflorus; bracteæ triangulo-subulatæ, ovariis pedicellatis longe breviores; ovaria pedicellata, curvula; sepala ligulata, obtuse acuta; petala linearia, apiculata; labellum omnino adnatum, trifidum, laciniæ laterales semiovatæ retrorsum angulatæ extrorsum hinc lobulatæ, lacinia media bifida, lacinulis divaricatis denticulo medio interjecto, basis lævis; columna omnino labello accreta, apice dilatata, androclinium linearibus emarginatum, dens semiovatus acutus utrinque; color ochroleucus, albidus, maculis occultis purpureis.—Hab. It comes from Guatemala, and has flowered lately, under Mr. Green's able management, in the rich collection of W. Wilson Saunders, Esq.—*Gard. Chron.* 1870, p. 1246.

Eremophila, *sp. nov.*, *F. Müll.* (*Myoporaceæ*). No description.—*Vide Journ. Bot.* Vol. VIII. p. 321.

Eriostemon, *sp. nov.*, *F. Müll.* (*Rutaceæ*). No description.—*Vide Journ. Bot.* Vol. VIII. p. 322.

Eucomis clavata, *Baker* (*Liliaceæ*, *Scilleæ*); foliis 9–12 late oblanceolatis acutis vel subobtusis pedalibus vel ultra planiusculis, margine minute breviter ciliatis, scapo crasse clavato racemo dimidio breviore, racemo subdenso 50–80-floro 3 poll. crasso, pedicellis crassis brevissimis, comæ foliis 20–25 lanceolatis floribus paulo excedentibus.—Hab. A native of Cape Colony, Mr. Cooper, Hort. Saunders.—*Ref. Bot.* t. 238.

Fernandoa (*errore* Ferdinandoa) magnifica, *Seem.* (*Bignoniaceæ*). —*Vide Journ. Bot.* Vol. VIII. p. 280.

Fritillaria collicola, *Hance (Liliaceæ).—Vide Journ. Bot.* Vol. VIII. p. 76.

Gerrardina, *Oliv. gen. nov.* (*Samydaceæ*, *Homalieæ*). Flores hermaphroditi. Calyx campanulatus, 5-fidus, tubo brevi, limbi lobis inæqualibus 2 exterioribus brevioribus rotundatis interioribus late ellipticis, æstivatione imbricatis. Discus tubum calycis vestiens, punctatus, margine late 5-crenulatus. Petala 5, calyce breviora et cum lobis calycinis alternantia, margine disci inserta, ovato-rotundata, basi late cuneata. Stamina petalis numero isomera et eisdem opposita, margine disci inserta; filamenta subulata; anthera . . . Ovarium liberum, obovoideum, apice turbinatum v. subtruncatum, pubescente, basi latum, uniloculare; stylus brevis, subulatus, centricus; stigma (ut videtur lobulatum); ovula anatropa 4, in placentis duabus per paria in apice cavitatis pendula. Fructus siccus, monospermus. Semen pericarpio conforme, pendulum, obovoideum; testa lævis, glabra; embryo et albumen . . .—Frutex v. arbuscula? Folia alterna, simplicia, coriacea, persistentia, serrulata. Stipulæ minutissimæ v. 0. Flores parvi, cymosi, pedunculati.

G. FOLIOSA, *Oliv. sp. unica.*—HAB. Natal, W. T. Gerrard, 1865.—*Hook. Ic. Plant.* t. 1075.

GOMPHRENA PEARCEI, *Oliv.* (*Amarantaceæ*); herbula diffusa, glabra, caulibus pluribus brevibus umbellatis carnosulis, ramulis ex eodem nodo sæpius 4–5 divaricatis, capitulis numerosis breviter pedunculatis 8–12-floris, bracteis involucralibus herbaceis glabris floribus brevioribus, bracteolis obovato-rotundatis tenuiter albo-membranaceis, perianthii foliolis anguste obliquis basi tubo stamineo adnatis.—HAB. Pogota, 10,000 ft., March, 1804, R. Pearce. (This locality I do not find in the Andes. Perhaps Bogotá may be meant.)—*Hook. Ic. Plant.* t. 1073.

HAWORTHIA COOPERI, *Baker* (*Liliaceæ, Aloineæ*); acaulis, foliis 30–40 pro genere haud crassis in rosulam dense confertis oblongo-lanceolatis sesquiuncialibus triplo longioribus quam latis longe aristatis pallide viridibus utrinque convexis in tertio superiore pellucido-vittatis apice pellucido, ad marginem carinam et insigniter ad aristam setis pellucidis patentibus ciliatis, exterioribus ascendentibus, pedunculo pedali, racemo 10–12-floro modice denso, bracteis parvis deltoideis pedicellis perbrevibus erecto-patentibus superantibus, perianthio albido purpureo-vittato limbo distincte bilabiato tubo duplo breviore.—HAB. A native of Cape Colony, discovered by Mr. Cooper; Hort. Saunders.—*Ref. Bot.* t. 233.

H. PILIFERA, *Baker;* acaulis, foliis 20–30 crassissimis in rosulam dense confertis, exterioribus patentibus oblongis vix uncialibus pilifero-aristatis e medio sursum ad basin aristæ cite angustatis pallide viridibus facie paullulum convexis, dorso rotundatis, utrinque per tertiam superiorem pellucido-vittatis, apice pellucido, ad marginem, carinam et præcipue ad aristam setis pellucidis patentibus ciliatis, pedunculo semipedali, racemo 10–12-floro, bracteis parvis lanceolatis, pedicellis perbrevibus vel subnullis, perianthio albido viridi vittato, limbo distincte bilabiato tubo duplo breviore.—HAB. A native of Cape Colony, discovered by Mr. Cooper; Hort. Saunders.—*Ref. Bot.* t. 234.

H. SUBREGULARIS, *Baker;* acaulis, foliis circiter 30 in rosulam dense confertis ovato-lanceolatis acutis uncialibus et ultra 2½-plo longioribus quam latis facie subplanis dorso convexis carinatis pallide viridibus vittis verticalibus 5–6 saturatioribus notatis supra prope apicem et infra in dimidio superiore punctis parvis rotundatis granulatis marginibus et carina denticulatis, pedunculo semipedali, racemo 12–18-floro subæquante, bracteis lanceolatis cuspidatis pedicellis erecto-patentibus æquantibus, perianthio albo viridi vittato segmentis ligulatis subregulariter falcatis tubo dimidio brevioribus.—HAB. A native of Cape Colony, gathered by Mr. Cooper; Hort. Saunders.—*Ref. Bot.* t. 232.

HEBECLADUS VENTRICOSUS, *Baker* (*Solanaceæ*); fruticosa, ramis glabris haud volubilibus, foliis breviter petiolatis herbaceis subglabris ovatis acutis integris vel paullulum sinuato-dentatis, floribus ex axillis nutantibus pedunculatis solitariis vel geminis, calycibus flore expanso horizontaliter patentibus, dentibus lanceolatis recurvatis, corollis pallide flavis subæquilongis ac latis ventricoso-campanulatis fauce constrictis, lobis lanceolatis recurvatis dentibus acutis interjectis, staminibus cum stylo longe exsertis.—HAB. Peru, Hort. Saunders, from Mr. Farris.—*Ref. Bot.* t. 208.

HEDYOTIS (OLDENLANDIA) BOERHAAVIOIDES, *Hance (Cinchonaceæ).*—*Vide Journ. Bot.* Vol. VIII. p. 73.

HYACINTHUS CANDICANS, *Baker* (*Liliaceæ*); foliis 5–6 ascendentibus lorato-lanceolatis bipedalibus vel ultra carnoso-herbaceis glaucescentibus extrorsum planiusculis, scapo erecto firmo tripedali vel ultra, racemo laxo subpedali 12–20-floro, pedicellis cernuis imis floribus subæquantibus, bracteis lanceolatis pollicaribus, perigonio sesquipollicari albo laciniis subæqualibus obovato-lanceolatis erecto-patentibus tubo infundibuliformi-campanulato subduplo longioribus, filamentis ex fauce tubi subuniseriatis laciniis brevioribus, stylo ovario subæquante, capsula oblonga obtusa trisulcata, seminibus triquetris in loculis numerosis.—HAB. Cape Colony, gathered by Drége and others, sent to England in the living state to Mr. Wilson Saunders by Mr. Cooper. Nearest *H. orientalis*, amongst previously-known species.—*Ref. Bot.* t. 174.

H. PRINCEPS, *Baker;* foliis 5–6 ascendentibus lorato-lanceolatis bipedalibus carnoso-herbaceis viridibus extrorsum planiusculis, scapo erecto foliis excedente, racemo lato sublaxo 12–18-floro, pedicellis strictis erecto-patentibus imis bracteis lanceolatis duplo longioribus, floribus primum cernuis mox erecto-patentibus, perigonio albido subsesquipollicari, tubo leviter ventricoso, laciniis patulis tubo ægre æquantibus interioribus latioribus et brevioribus, filamentis infra medium tubi biseriatis longitudine perigonii tres-quadrantes æquantibus, stylo ovario paullulum longiore, capsula oblonga obtuse trisulcata, seminibus triquetris in loculis copiosis. —Cape Colony, Hort. Kew., gathered by Mrs. Barber. Close to *H. albicans.*—*Ref. Bot.* t. 175.

KALANCHOE GRACILIS, *Hance (Crassulaceæ).*—*Vide Seem. Journ. Bot.* Vol. VIII. p. 6.

K. MACROSEPALA, *Hance.*—*Vide Seem. Journ. Bot.* Vol. VIII. p. 5.

KNIPHOFIA PRÆCOX, *Baker;* foliis bipedalibus ensiformibus deorsum 2 poll. latis pallide viridibus, marginibus subtiliter denticulatis carina lævi, scapo foliis subduplo breviore, racemo præcoci oblongo-lanceolato dense 40–60-floro, pedicellis perigoniis 7–8-plo brevioribus, bracteis lanceolatis acutis pedicellis 2–3-plo longioribus, perigonio sesquipollicari supra ovarium leviter constricto, staminibus mox perigonia æquantibus. —HAB. Cape Colony, Cooper, Hort. Saunders. Allied to the well-known *K. Uvaria*, but flowers in the early summer.—*Ref. Bot.* t. 169.

LUISIA MICROPTERA, *Reichb. f.* (*Orchideæ*); foliis teretibus subvalidis; racemo paucifloro; sepalis ligulatis acutis petalis longioribus; labelli portione basilari ovata juxta basin utrinque uncinata, portione antica lato ovato triangulo.—HAB. Sent from Assam by Col. Benson to Messrs. Veitch.—*Gard. Chron.* 1870, p. 1503.

MACOWANIA, *Oliv. gen. nov.* (*Compositæ*). Capitulum multiflorum, heterogamum; floribus radii uniseriatis ligulatis femineis, disci tubulosis abortu masculis. Involucrum hemisphæricum; squamæ multiseriatæ, imbricatæ, ovatæ v. lanceolatæ, inæquales, rigidiusculæ, subscariosæ, intus glabræ, interiores longiores lineari- vel oblongo-lanceolatæ, obtusæ. Receptaculum leviter convexum, epaleaceum. Corollæ radii ligulatæ, ligula late oblonga v. elliptica apice 3-denticulata; disci tubulosæ, 5-dentatæ. Antheræ corolla æquilongæ, lineares, basi utrinque aristatæ. Stylus fl. radii longiuscule bifidus, ramis linearibus obtusis glabris intus canaliculatis marginibus longitudinaliter stigmatosis; fl. disci abortivi cylindraceus, apice vix aut leviter crassior, extus papillosus, brevissime et obtuse bilobulatus. Achænium inappendiculatum, leviter arcuatum, subteres, longitudinaliter valide 14–15-costatum, obsolete puberulum. Pappus uniserialis, setaceus, setis liberis rigidis scabridis inæqualibus caducissimis. —Frutex glanduloso-hirtus, ramis foliosis apice corymbosim ramulosis. Folia alterna, sessilia, patentia v. reflexa, rigida, linearia, acuta, marginibus revolutis glanduloso-setulosis. Capitula terminalia, solitaria, flava, breviter pedunculata v. subsessilia.

M. revoluta, *Oliv. sp. unica ;* folia sæpius conferta, ½–1 poll. longa; pedunculi erecti, foliis superioribus breviores, glanduloso-hirti v. pilosi, ¼ poll. longi v. interdum capitula subsessilia; involucrum ½ poll. diam., glanduloso-hirtum, squamulis indefinitis, marginibus apicem versus discoloribus, exterioribus minutis ovatis, interioribus gradatim longioribus lanceolatis oblongisve appresse imbricatis; flores radii circiter 7–12, ligula subplana, disci tubulosi involucro æquilongi.—Hab. Collected on the mountains of the Buffalo River, British Kaffraria, by P. M'Owan, Esq. Distributed under n. 2013 by the "South African Exchange Club," conducted by the same gentleman.—*Hook. Ic. Plant.* t. 1062.

Marcgravia nepenthoides, *Seem. (Marcgraviaceæ).—Vide Journ. Bot.* Vol. VIII. p. 245.

Maxillaria ctenostachya, *Reichb. f.* (*Orchideæ*); caulescens, foliis sub bulbo diphyllo vaginantibus pluribus, folio summo laminigero, foliis reliquis triangulis ancipitibus carinatis, laminis ligulatis acutis, inflorescentiis distichis, squamis triangulis carinatis pluribus (13–15) imbricantibus, floribus exsertis secundis, bractea appressa acuta parva, ovarium subæquante, mento obtusangulo parvo, sepalis triangulo-ligulatis acuminatis, petalis subæqualibus, labello trilobo subventricoso, lobis lateralibus obtusangulis, lobo medio ligulato obtuso producto, flavo furfuraceo, carinis ternis serrulatis a basi in basin lobi medii, ibi abrupto calloso confluentibus, utrinque superaddita carinula serrata abbreviata.—A very interesting species, in a morphological point of view. The floriferous axes are covered with imbricate carinate triangular sheaths, and thus they look like stems of Lockhartias. From the axils of the sheaths arise the peduncled exserted flowers, which are ochre-coloured, and very like those of *Maxillaria lepidota*, Lindl., belonging to the "acaules" group. Their tails are so long that they remind one of a *Brassia*. Hab. Imported from Costa Rica by Messrs. Veitch.—*Gard. Chron.* 1870, p. 39.

Monolæna primulæflora, *Hook. f.* (*Melastomaceæ*); glaberrima, rhizomate crasso tuberoso, foliis petiolatis late ellipticis acuminatis coriaceis obscure sinuato-dentatis ciliatis 3–5-plinerviis, supra læte viridibus, subtus petiolisque rubro-purpureis, pedunculis ex apice rhizomatis numerosis petiolo subæquilongis 2–3-floris, calycis tubo globoso lobis inæqualibus rotundatis, petalis roseis basi albis.—Hab. New Granada, Hort. Kew., from Mr. Bull.—*Bot. Mag.* t. 5818; also *Gard. Chron.* 1870, p. 309, fig. 53, 54, and *Floral Mag.* plates 471, 472.

Monolophus cœnobialis, *Hance (Zinziberaceæ).—Vide Seem. Journ. Bot.* Vol. VIII. p. 73.

Mormodes tibicen, *Reichb. f.* (*Orchideæ*); sepalis petalisque lineari-ligulatis acutis; labello revoluto curvo stomachiformi acuto supra medium fovea impressa triangula, latere altero alteri appresso superficie superiori pilosa, limbo minute punctulato, superficie inferiori nervosa radiata.—Hab. Believed to come from New Granada.—*Gard. Chron.* 1870, p. 1085.

Muscari (Botryanthus) grandifolium, *Baker* (*Liliaceæ*); foliis 5–6 ensiformibus planiusculis flaccidis carnoso-herbaceis glaucescentibus

sesquipedalibus vel bipedalibus, scapo foliis 4-plo breviore, racemo denso 15–20-floro, pedicellis cernuis floribus subtriplo brevioribus, perigonio livide cæruleo oblongo-rotundato sesquilongiore quam crasso, superne nullo modo angulato, fauce distincte constricto, dentibus deltoideis albidis recurvatis tubo 5–6-plo brevioribus.—HAB. Cultivated at Kew, the native country unknown; altered to *M. botryoides*.—*Ref. Bot.* t. 173.

OBBEA, *Hook. f. gen nov.* (*Rubiaceæ, Timonieæ*). Flores hermaphroditi. Calycis tubus turbinatus; limbus cupularis, truncatus, obscure 4-dentatus. Corolla coriacea, sericea; tubus elongatus, fauce paulo dilatata intus glaberrima; lobi 4, breves, patentes, imbricati, 2 exteriores. Stamina 4, fauci corollæ inserta, inclusa, filamentis brevissimis; antheræ lineares, dorso infra medium affixæ, basi breviter 2-lobæ. Discus inconspicuus, pubescens. Ovarium 2-loculare; stylus filiformis, stigmatibusque 2 linearibus inclusis pilosis; ovula in loculis solitaria, ab apice pendula, funiculo incrassato. Drupa . . .—Arbor? ramosa, ramulis teretibus, ultimis sericeo-tomentosis. Folia opposita, gracile petiolata, ovato-v. lanceolato-oblonga, nervosa et creberrime reticulatim venulosa, nervis subtus pilosis. Stipulæ interpetiolares, squamosæ, caducæ. Flores inter minores, in cymas paucifloras ramosas axillares pedunculatas dispositi, pedicellis infra calycem articulatis et minute bracteolatis.

✓ O. TIMONIOIDES, *Hook. f. sp. unica.* HAB. Sandwich Islands; western end of the Kokala range, Dr. Hillebrand, n. 186.—*Hook. Ic. Plant.* t. 1070.

ODONTOGLOSSUM BLANDUM, *Reichb. f.* (*Orchideæ*), (*Euodontoglossum*) (affine *O. nævio*, Lindl.); sepalis petalisque cuneato-lanceis acuminatis, labelli ungue bilamellato, lamellis oblongis antice obtusangulis, lamina ab ungue cuneato velutino ampliato ovata acuminata crispula, cornubus brevibus geminis ante lamellas antepositis falcibus geminis, tumore parvo interjecto, cirrhis columnæ basi angulatæ bifidis setaceis.—*Gard. Chron.* 1870, p. 1342.

O. LIMBATUM, *Reichb. f.*; panicula ampla multiflora, sepalis triangulolanceis, petalis rhombeis acutis hinc lobulatis dentatisve, labelli ungue basi columnæ adnato, lamina a basi cordata oblongo-attenuata crenulata serrulata apice aristata, carinis unguis in discum exeuntibus, media simpliciter acuta, lateralibus in laminas rhombeas hinc dentatas exeuntibus, columna incurva basi obtusangula, alis laceris.—*Gard. Chron.* 1870, p. 417.

(*To be continued.*)

New Publications.

Natural History of the Azores, or Western Islands. By F. DU CANE GODMAN, F.L.S. London. 1870.

Of the 358 pages of which this volume consists, sixty-eight, at the outside, are the production of the gentleman whose name stands alone on the title-page. He is responsible for the account of the few vertebrates of the Isles, and for the scanty lists of *Hymenoptera* and *Lepidoptera*. The catalogue of *Coleoptera* is by Mr. G. R. Crotch, and the Rev. H. B. Tristram furnishes the short account of the terrestrial molluscs. Our business, however, is not with the zoological side of the book, but with the more extensive catalogue of plants by which nearly two-thirds of it is occupied. For the list of flowering plants and Ferns botanists are indebted to Mr. H. C. Watson, for that of the Mosses and *Hepaticæ* to Mr. Mitten.

We are so much accustomed to look upon Mr. Watson as our veteran British botanist, that it is a small surprise to find him occupying himself with the flora of a foreign land; it is probable that many of our readers now learn, for the first time, that, so long back as 1842, Mr. Watson spent four months on one of H. M.'s ships (then engaged in surveying the Azores) examining, as well as such circumstances would allow, the vegetation of those islands. Some results of this expedition, as far as botany is concerned, will be found in vols. ii. and iii. of Sir W. Hooker's 'London Journal of Botany,' the latter of which contains a full list of all the species then known. To this were added in the sixth volume, some fifty more found by Mr. Hunt, a resident in St. Michael's. Mr. Watson himself collected some 340 species, and for the last twenty-five years has had many in cultivation in his garden. From all this it will be evident that he is very well fitted, from his own observation, to write an Azorean flora, whilst it is scarcely necessary to say that in estimating the value of the alleged facts of other observers no botanist has had more experience than Mr. Watson.

In our volume for 1867 (Vol. V. p. 89), M. Drouet's 'Catalogue de la Flore des Iles Açores,' published the previous year, was noticed, and the careless manner in which, from ignorance of synonymy, the list of species is unduly extended, was alluded to. In the catalogue before us, Mr. Watson credits Mr. Drouet and his fellow-collectors with the addition of but thirteen species to those previously known. The whole number of species enumerated in Mr. Watson's list is 478, and it is probable that further research would not greatly add to this number, as Mr. Godman, who collected in 1865, and brought over a fine series of specimens, some or all of which are now in the Kew herbarium, only added six species. Of the whole number, the author has seen specimens of all but thirty-eight, and of these some will probably turn out to be errors of name. This is not a large flora for a group of nine islands, lying between 37° and 40° N. latitude; and even of these species not a few are likely to be recent introductions from Europe. The nearest point of the Continent to the Azores is the southern part of Portugal, distant some 750 or 800 miles, and as Dr. Hooker has pointed out, the Azorean flora is mainly S. European or Mediterranean; about 400 species are common to Europe and the Azores, and it is especially to the rich and varied flora of the Peninsula that the island vegetation has the greatest affinity. Mr. Watson gives a list of ten Azorean species which occur in Europe in the Peninsula alone, and his surmise of this list being probably incomplete is doubtless correct; published matter on the Portuguese flora is very scanty, but an examination of Dr. Welwitsch's extensive collection made in Algarvia, the southernmost province of Portugal, would, it is believed, add to its flora several species now supposed to be restricted to the Atlantic isles. Of the European species found in the Azores, more than 270 appear to be British; the south-west part of Ireland is next after Portugal the part of Europe nearest to the islands, and it is interesting to find some characteristic Irish species in their flora, *Dabeocia polifolia* and *Trichomanes speciosum*, for example. After deducting these European species, some eighty remain, forming part of the "Atlantic element" of Dr. Hooker;* about thirty-six only, however, are common to the Azores and the Madeira and Canaries groups, and from this short list probably a quarter must be subtracted for various reasons; yet Madeira is but five hundred miles distant. The relationship with America is singularly slight, four species only of those which are neither European nor Madeiran being common to that continent and the Azores. The widely spread African shrub *Myrsine africana* alone (of the same list) represents the flora of the much nearer continent of Africa, which is only what might be expected when we remember how small an African element is found, even in the Canarian flora.

The remarkable fact remains, that forty species (one-twelfth of the whole flora) are peculiar to the islands. A list of these will be of value to our readers:—*Cardamine Caldeiranum, Nasturtium flexuosum, Cerastium azoricum, Hypericum foliosum, Vicia Dennesiana, Rubus Hochstettorum, Sanicula azorica, Ammi Huntii, Petroselinum trifoliatum, P. Seubertianum, Solidago azorica, Seubertia azorica, Senecio malvæfolius, Tolpis nobilis, Microderis rigens, M. filii, Campanula Vidalii, Vaccinium cylindraceum, Erica azorica, Erythræa Massoni, Veronica Dabneyi, Euphrasia grandiflora, Myosotis azorica, M. maritima, Lysimachia azorica, Euphorbia azorica, Habenaria micrantha, H. longebracteata, Luzula purpureo-splendens, Carex azorica, C. lævicaulis, C. rigidifolia, C. Hochstetteriana, C. floresiana, C. Vulcani, ? Deyeuxia cæspitosa, ? D. azorica, Holcus rigidus, Festuca petræa, Isoetes azorica.* It will be observed that, with the exception of *Seubertia* and *Microderis*, all the genera are European. As above hinted, this list is likely to be somewhat reduced by a more systematic examination of the plants of Portugal. As, however, Mr. Watson, who has had many of these specially Azorean plants under cultivation, finds them to require a damp, equable climate, such as is found in their native islands, and to be quite unfitted to endure a Continental one, we can only expect the more robust species as the *Carices* and grasses to be found in Europe. A useful table is added to the catalogue, showing the distribution (approximately) of the Azorean plants through Europe, Madeira, Canaries, Africa, and less completely America. It would have been interesting to have traced, as far as is possible, each species through the nine islands composing the Azorean group.

Mr. Watson has defined elsewhere some half-dozen of the novelties of the islands, and in the volume before us he fully describes *Vicia Dennesiana*, found by Mr. Hunt, in St. Michael's, a remarkable plant, with large flowers, which change colour during their expansion. The *Spergularia* of the Isles, which the author is much inclined to describe as a new species, has been already distinguished by Kindberg in his 'Monograph of the genus *Lepigonum*' (p. 30 and f. 15) as *L. azoricum.*

In the list of *Musci* and *Hepaticæ*, Mr. Mitten has not confined himself to the Azores, but included the other Atlantic isles, Madeira and the Canaries. His catalogue of Mosses amounts to 151, only forty-seven of which have been met with in the Azores; *Bartramia azorica* seems to be the only species peculiar to these islands. Of *Hepaticæ*, sixty-eight species are known to occur in the Atlantic islands; of these nineteen are enumerated as Azorean, and two *Gymnomitrium erythrorhizum* and *Rhacotheca azorica*, are supposed to be peculiar to that flora. Mr. Mitten has described several new species from Madeira and Teneriffe, and his portion of the book is a valuable addition to our knowledge of the Moss flora of the parts to which it refers.

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* 'Lecture on Insular Floras,' 1866.

We miss in the book an account of the climate, geology, and topography of the Azores, useful adjuncts to a 'Natural History.'

H. T.

A Manual of Botany: including the Structure, Functions, Classification, Properties, and Uses of Plants. By ROBERT BENTLEY, F.L.S., M.R.C.S.E. Second Edition. London: Churchill. 1870. Pp. 832.

Professor Bentley's 'Manual' belongs to a well-known series of text-books for the medical schools, many of which have obtained a more than professional popularity. The conditions of their publication imply a somewhat conventional treatment of their subjects; and while anything like originality is therefore hardly to be expected in the present case, as indeed it would be scarcely appreciated, it would yet be difficult to name any existing treatise, which contains, in so compendious a form, an equivalent mass of information. Indeed, if the book were to be criticized quite abstractedly upon its own merits, it might be objected that it contained too much, and that the wealth of illustration and exposition of often almost purely hypothetical terms, applicable only to Phanerogams, might be desirably exchanged for a fuller account of Cryptogams. Take for example the Fungi; all the information given about them is compressed into some seven pages, while the mere terminology of Phanerogamic fruits alone occupies thirty. One sighs to turn over the old familiar useless story about *Galbulus* and *Tryma*, *Nuculanium* and *Diplotegia*, *Syconus* and *Sorosis*, to find at the end, as a reward for one's pains, that of such names "in practice, only a few are in common use." The statement that "the diseases known as blight, mildew, rust, smut, vine-mildew, potato-disease, ergot, etc., are either caused from, or accelerated by, the agency of Fungi" (p. 721), is, in contrast with this, a more condensed than useful account of some of the most terrible scourges of humanity. A great deal is known of the part played by Fungi in causing these maladies, and of the measures which are more or less remedial of them, but of these nothing is stated. Yeast, by the way, is not very correctly supposed to be "a mycelial state, *composed of* conidial cells of a species of *Penicillium*," and no mention is made, in connection with it, of *Bacteria*, nor is there any account of the curious history of *Æcidium Berberidis*, or, except a passing allusion, of De Bary's *Mycetozoa*. Such things, however, are not required for examinations, the nomenclature of fruits possibly may be.

Yet, in this matter, we must not forget that the exigencies of a text-book adapted to the present requirements of students, have deprived Professor Bentley of much room to exercise his own judgment. We cannot expect philosophically-arranged text-books till we get students who are willing to work at the botanical sides of biology for its own sake alone. The subject-matter is arranged after the usual fashion in English books; the so-called structural, systematic, and physiological divisions follow in successive order. Such an arrangement does tolerably well for Phanerogams, but breaks down miserably for all other plants, so that nowhere in the book do we get a connected account of any Cryptogamic class; but, in trying to follow it out, are sent on no particularly fixed principle from one division to another. As we meet with more lowly differentiated types, it becomes, in fact, more and more impossible to discuss properly, apart from each other, structure and function.

The introductory remarks deal with the distinctions between plants and animals. First and foremost is, of course, their fundamental relation to the inorganic world. The most philosophical plan is to show how all other differences can be made to flow from this one. Too much stress is perhaps laid on the absence of nitrogen from the permanent parts of plants; they are as incapable as animals of existing without it, and, indeed, it is obvious that if they were devoid of nitrogen, animals must be so also, as all animal nitrogen is derived ultimately from the plant world. The greater proportion of nitrogen required by animals seems to depend on their greater activity. There is no activity without chemical change in the tissues of the living organism, and as all organic nitrogenous compounds are unstable, it is not unreasonable, with Mr. Herbert Spencer, to correlate the mutability of these compounds with the presence of nitrogen. Plants are in the main passive, not active; hence the presence of any large proportion of nitrogen in them would be useless. As we descend in the animal world, we are not surprised to find indications of plant peculiarities; hence, in some Molluscoida, we have a substance not very different from cellulose, and finally, in the *Radiolaria*, actual starch, indistinguishable from that of vegetable origin.*

It seems to be an accepted principle to restrict botanical text-books to recent plants, and to say as little as possible about fossil botany. In the present volume the subject is altogether omitted. This seems a matter for regret, because in the case of any particular group, the great end in view should always be to reach the most generalized conception of its structure, and fossil plants may supply in part or even wholly the key to this. There is a general impression, for example, that acrogenous plants only grow at their summits; yet the gradual elongation of the leaf-scars and their separation from one another as we proceed from the newer to the older parts of the stem, prove that in the *Lepidodendrons*, as in existing tree-ferns, growth never absolutely ceased in a longitudinal direction at any part of the axis; again, in *Lepidodendron*, the vascular tissue of the stem was not at first produced to its full extent, but was continually added to from a Cambium layer, an arrangement of which, among allied plants, *Isoetes* is the only existing representative. No account, however, of the little-noticed structure of the corm of this curious plant is to be found in the present volume. The necessity, in any really general study of morphology, of taking into account both existing and recent types of plants, is well illustrated by the structure of *Bennettites*, a genus of fossil *Cycadeæ*, which has been shown by Mr. Carruthers† to belong to an entirely new group of the Order, standing to some extent in the same relation to other Cycads that *Taxus* does to other *Coniferæ*. Besides the possession of a trunk ovoid in outline, the woody cylinder is pierced by large meshes for the passage of the whole of the fibro-vascular bundles passing to each leaf,—an arrangement which can only find its parellel in the caudex of tree-ferns In all other Cycads a number of small bundles perforate the woody cylinder separately to pass collectively into each petiole; and here, it must be observed, that in describing the structure of the stem of arborescent Ferns, Professor Bentley, as seems to be generally the case with English writers, has missed the significance of the openings in the vascular cylinder, which are not at all for the purpose of the communication of the cortical and medullary parenchyma, but are in reality the organic bases of the leaves. This was pointed out by Mohl, and has also been independently ascertained by Mr. Carruthers. It must inevitably soon be impossible to study apart the existing and extinct types of organized structures; it would be a philosophical proceeding to anticipate what cannot be long delayed.

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* See 'Nature,' vol. ii. p. 178.

† Trans. Linn. Soc. vol. xxvi. p. 695.

The pages of this 'Manual' are profusely supplied with beautiful illustrations, in a large number of cases, it is true, common to this and other English text-books, and acknowledging a common parentage in the 'Atlas' of Le Maout. A perusal of the part devoted to organography is much facilitated by their aid. Perhaps more might be done, as with the fruits mentioned above, in omitting detail and describing structures in more general language. Under the head, for example, of "aerial modifications of stems," we have the *runner*, *offset*, *stolon*, *sucker*, and *rhizome*, from which the *soboles* is separated as a "subterranean modification;" of these the *runner* and *offset* on the one hand, and the *sucker*, *rhizome*, and *soboles* on the other, have nothing essential that distinguishes them, while the *stolon*, as defined here, is more a habit than a structure; yet so purely is the whole thing a matter of theory, that further on, under the head of roots, we have a whole page occupied, somewhat apologetically, it is true, with the rhizomes of *Scabiosa succisa* and *Polygonum Bistorta*.

A special excellence belongs to the systematic portion, especially in the economic details,—a hunt through these shows how very carefully this part of the subject has been worked up, indeed, for purposes of reference, it will be found almost indispensable in these matters to possess the 'Manual.' The sequence of the Orders is mainly Candollean, with apparently nothing borrowed from the labours of Hooker and Bentham. Something might have been done to indicate by difference of type the more important Orders, and seven pages devoted to an exposition of Linnæan classification are utterly wasted.

The physiology has been revised by Dr. Trimen, but a space so limited as eighty pages must have made it difficult to do more than scanty justice to this important but, in this country, little-studied side of botany. Recent researches have, however, by no means been overlooked, and we have brief notices of the histological nomenclature of Dr. Beale, Mr. Spencer's views on the movements of sap, climbing plants as studied by Darwin, etc. It is satisfactory also to notice that points stated in earlier pages somewhat too absolutely, are here often modified. This is the case with the account given of germination (p. 789). As a matter of fact, though contrary to what is said in books, it is almost impossible to lay down any criterion for distinguishing the germination of Monocotyledons and Dicotyledons which does not in some case or other break down. The statements made in the former edition as to the prolonged vitality of seeds have been altered; the case of *Nelumbium*, from Sir Hans Sloane's herbarium, is probably one of the best authenticated, but it will still tax the credulity of many readers to see that it is thought possible that seeds deposited when the valley of the Tweed was a lake, would germinate now. To some persons the existence of batrachians, contemporary with a carboniferous flora, yet still living in coal mines, is not incredible; in fact, a well-vouched-for specimen was shown *in situ* at the last International Exhibition in London,—among such the Tweed valley seeds may find believers. It would be unfair to criticize, in detail, so carefully condensed a summary, and with two remarks we may take our leave of a very useful book. The first is, that a little stronger ground might have been taken (p. 751) as to the assimilation by plants of uncombined nitrogen. Any chemist knows how all but impossible it is that this could happen, and amongst modern workers, the experiments of Lawes and Gilbert may be accepted as conclusive even against those of M. Ville. Lastly, the old belief that the temperature of trees exposed to great heat, is lower than that of the surrounding air, is no longer justified, as the careful experiments of Becquerel* show that the reverse is really the case, there being at least as much as 1° Centigrade difference.

W. T. T. D.

Proceedings of Societies.

Linnean Society.—*December* 1*st*, 1870.—G. Bentham, Esq., in the chair. The following papers were read by the President:—"A Supplementary Note on Chinese Silkworm Oaks," from Dr. H. F. Hance. The author had previously pointed out that *Q. mongolica*, Fisch., was the Oak on which the silkworm larva of the north of China chiefly fed. He now showed that *Q. serrata*, of Thunberg, is another silkworm-rearing species. Also "On the Sources of the *Radix Galangæ minoris* of Pharmacologists," by the same. The source of the lesser *Galangal* has long been doubtful. Dr. Hance, during an expedition to the north coast of Haenan, found the dried roots exposed to the sun in baskets, and in the same district the plant itself was seen in cultivation, and subsequently discovered growing wild. It is a species of *Alpinia*, not *A. chinensis* as has been supposed, but a species closely allied to *A. calcarata*, Rosc. Dr. Hance believes it to be undescribed, and he has named it *A. officinarum*. It seems probable that its fruit is the "bitter-seeded Cardamom," figured by Mr. Hanbury in Pharm. Journ. vol. xiv. p. 418. f. 8.

December 15*th*.—G. Bentham, Esq., President, in the chair. The following communications were read:—"On Sabadilla (*Asagræa officinalis*), from Caracas," by A. Ernst. The plant is found abundantly in the neighbourhood of Caracas, and the drug which is prepared from the seeds is largely exported thence to Hamburg. It has not been previously known out of Mexico, and the Venezuelan form differs slightly from the Mexican type; should it prove distinct, M. Ernst proposes to call it *A. caracasana*. —"On *Darlingtonia californica*, the Californian Pitcher-plant," by W. Robinson. It grows at an altitude of 5000 feet, in the Sierra Nevada. The pitchers are as large as Jargonelle Pears, and are all twisted spirally in their upper portion. At the lower part is found a layer of from 2 to 5 inches of the remains of insects which have been attracted by some unknown cause. The pitcher is about 2 inches wide at the top, and narrows gradually to about a line at the base; the lower part is densely beset with rigid hairs, all pointing downwards, which prevent the return of any insect that has ventured far down. "On Carnivorous and Insectivorous Plants," by Mrs. Barber. The author considered *Nepenthes*, *Sarracenia*, *Darlingtonia*, *Cephalotus*, and the Cape species of *Drosera* and *Roridula* as predatory plants.

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* 'Mémoires de l'Institut,' t. 35, p. 467.

Jan. 19*th*, 1871.—G. Bentham, Esq., President in the chair. A photographic album, 'In Memoriam Caroli a Linné,' published in Sweden, and consisting of mounted photographs of places connected with the life and death of the great botanist, was exhibited. The price of the book is £2, and it can be obtained from Mr. Oscar Dickson, of Gottenburg. Specimens of *Caucalis latifolia*, collected near Keynsham, Gloucestershire, by Mr. Flower, were exhibited [additional district (5) to those given in Watson's 'Compendium']. The following papers were read:—By D. Hanbury, "Historical Notes on *Radix Galangæ* (*minoris*)." This was known as early as the ninth century, being mentioned in the MS. of an Arabian writer of that date; the later Greek physicians also notice it, and in North Europe it was known as early as the twelfth century, though not in common use in the West before the fifteenth. At present the chief consumption of this drug is in Russia, where it is used as a spice and flavouring as well as a medicine. Dr. Hooker read a letter from Mr. J. Atkin giving an account of S. Christoval, the most south of the Solomon Islands. A general view of the nature of the flora was given: there are few large trees or Grasses, and a complete absence of Tree-ferns.—"Notes on *Byrsanthus*," by Dr. M. T. Masters. The plant described by Guillemin as *Byrsanthus Brownii*, is not the same species as Brown's plant (*B. epigynus*, Masters, n. sp.) described in Tuckey's 'Congo.' The arrangement of the stamens in the genus is peculiar: in the outer row there are apparently 10 stamens alternating with 10 glands; Dr. Masters considers the glands opposite the sepals to be barren stamens, and the remainder to constitute 5 compound stamens (opposite the petals), each compound stamen consisting of a central gland, and on either side of this a stamen. The inner row consists of 5 glands (barren stamens) opposite the sepals, and 5 fertile stamens opposite the petals.

Botanical Society of Edinburgh.—*Jan.* 12*th*.—Alexander Buchan, Esq., President, in the chair. The following communications were read:—"Note on the Practical Application of Meteorology to the Improvement of Climate." By A. Buchan. In the 'Journal of the Scottish Meteorological Society' for April, 1870, there appeared a valuable paper by Mr. D. Milne Howe, Chairman of the Council of the Meteorological Society, on "Suggestions for Increasing the Supply of Spring Water at Malta, and improving its Climate," in which the author shows that plantations would increase the water supply of the island, and ameliorate its climate. The drawbacks to the climate of Malta are chiefly these:—During winter and spring the island is swept by cold northerly winds; during the summer months the heat is excessive, and during all seasons there is great scarcity of water. These climatic peculiarities, which are very deleterious to health and vegetation, may be regarded as primarily arising out of the geographical position of Malta. The winter temperature rapidly falls in proceeding from Malta towards the north-east; thus while at Malta the mean temperature of January is 56·0°; at Corfu it is 49 8°; at Belgrade 30·3°; at Kiew 20·4°; and at Moscow 12·4°. Hence northerly winds at Malta are peculiarly characterized by excessive cold and dryness. On the other hand, its proximity to Africa exposes it in summer to scorching blasts of heated air. These drawbacks are felt in their fullest extent, owing to the almost complete absence of trees on the island. The influence of forests on climate has been made a subject of investigation by meteorologists of late years, and though much still remains to be done, yet some important points have been established. The highest temperature of the air occurs in summer between two and three P.M., but trees do not attain their highest temperature till nine P.M. Changes of temperature take place slowly in the tree, but in the air they are rapid. Hence trees may be regarded, like the ocean, as powerful equalizers of temperature, in moderating the heat of the day, and in maintaining a higher temperature during the night. Since air is heated by contact with the soil, and since trees shield the soil from solar radiation, it is evident that trees diminish the force of the sun's rays, especially in the lower stratum of the atmosphere, which is breathed by man. Trees exhale moisture, and thus produce cold in the air by the latent heat abstracted from it. From this lowering of the temperature, and from the moisture which is exhaled, dry winds acquire greater relative humidity, and thus are deprived of much of their noxious influence; and since trees break the force of the wind, their beneficial influence is greatly augmented. During night the process of terrestrial radiation lowers the temperature of a tree at a slow rate. First the upper leaves are cooled, then those leaves immediately under, and so on, until the whole are cooled. Now in the earlier part of the day, before the tree is heated by the sun, its cool leaves present a very large surface to the air currents which pass through them. Hence the cooling influence of trees is very considerable, which all must have experienced in the deliciously cool breezes of well-planted parks on a warm summer day. This refrigerating influence of trees is sometimes well seen in the earlier part of the day, when the air is filled with fog. In such cases heavy drops of water fall from the trees and increase, on occasions, to the copiousness of a heavy shower; and, doubtless, when the air is saturated, the rainfall will be heavier when the wind advances on a forest, whose temperature is several degrees lower than that of the surrounding district, where there are no trees. Hence, then, it may fairly be inferred, if it has not been indeed proved, that trees bring about a different distribution of the rainfall, as respects the time of the day and the season of the year. Trees serve another important use. When rain falls on so dry and bare a soil as that of Malta, it runs off at once, and is lost in useless, if not destructive floods. But since the roots of trees penetrate the soil, and so loosen it, and render it porous, much of the rain is not only received and preserved by the trees, but what falls to the ground is allowed to sink into the soil, and fill the reservoirs of the deep-seated springs. And since, owing to the stillness and greater dampness of the air among trees, the evaporation from forest soil is only about a fifth of what it is in an open country, woods regulate the flow, and retard, if they do not altogether prevent the drying up of springs.—"Notes on the Structure and Measurements of Cells in the *Hepaticæ*. By James Williamson Edmond, M.B., C.M. The author described the characters and measurements of the leaf-cells of twenty-six species of British *Hepaticæ*, he also gave the measurements of the spores and elaters of several of the species. He considered that, owing to the great variation in the measurements, even in the cells of a single specimen, they could not be relied upon as characteristics of any species. The form, however, of the cells, the thickened or delicate cell-wall, the character of the contents, and the presence or absence of trigones at the angles of the cells he considered as of importance in determining the species. The paper was illustrated by drawings and specimens under the microscope. —"Notes on the Distribution of *Algæ*." By George Dickie, M.D., Professor of Botany, Aberdeen. (See p. 70.)—"On the Flora of the South of France." By James F. Robinson. Communicated by Mr. Sadler.—"Memoranda on Fir-cones chiefly in the Museum of Economic Botany, Edin. Royal Bot. Garden." By Professor A. Dickson, Glasgow. Dr. Dickson demonstrated some of the forms of spirals occurring in the cones of the Spruce Fir (*Abies excelsa*) by means of specimens where the cone-scales were numbered with oil-paint, different colours being used where desirable. The paint was allowed to dry, and then the cones were put up in jars with strong solution of salt. In this way he exhibited the following forms:—$\frac{8}{21}$ spiral (the normal form); $\frac{13}{34}$ spiral; $\frac{5}{18}$ spiral; and conjugate double (bijugate) $\frac{8}{21 \times 2}(=\frac{4}{21})$ spiral.* Dr. Dickson stated that while working at these cones he took occasion (by permission of Professor Balfour) to examine the collection of cones in the museum at the Edinburgh Botanic Garden, among which he noted the following: —A. Belonging to the ordinary series, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{2}{5}$, $\frac{3}{8}$, etc. *Pinus Pinaster* (10 cones), *P. Lambertiana* (3 cones), *Abies Morinda* (1 cone) $\frac{8}{21}$, *Pinus Jeffreyi* (3 cones) $\frac{13}{34}$, *Araucaria excelsa* $\frac{21}{55}$, *A. imbricata* $\frac{55}{89}$. B. Belonging to series $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{7}$, $\frac{3}{11}$, $\frac{5}{18}$, etc. *Abies Morinda* (1 cone), *Pinus Lambertiana* (1 cone), and *Cycas revoluta* (1 male cone) $\frac{5}{18}$, *Pinus Pinaster* (3 cones) $\frac{8}{29}$, *P. Jeffreyi* (1 cone) $\frac{21}{76}$. C. Belonging to series $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{9}$, $\frac{3}{14}$, $\frac{5}{23}$, etc. *Zamia furfuracea* (1 male cone) $\frac{2}{9}$. In another specimen of the same the antheriferous scales were in alternating whorls of 5. *Pinus Pinaster* (2 cones) $\frac{5}{23}$, *P. Lambertiana* (1 cone). Here the scales at the top and bottom of the cone exhibited a $\frac{5}{23}$ spiral. The middle of the cone, however, showed 10 secondary spirals running one way and 14 the other, being manifestly a bijugate $\frac{5}{12 \times 2}(=\frac{5}{24})$ spiral derived from the series $\frac{2}{5}$, $\frac{3}{7}$, $\frac{5}{12}$, $\frac{8}{19}$, etc.† This cone is immature and somewhat irregular in its development; and, curiously enough, while the generating spiral above and below runs to the right-hand, the two spirals in the middle run to the left. D. Belonging to series $\frac{1}{5}$, $\frac{1}{6}$, $\frac{2}{11}$, $\frac{3}{17}$, etc. *Stangeria paradoxa* (male cone) $\frac{2}{11}$. This is doubtless an abnormality, a cone growing upon a plant of the same species in the Edinburgh Botanical Garden exhibiting 13 vertical rows, of course resulting from a $\frac{5}{13}$ spiral. Separate allusion may be made to the cones of *Pinus Pinaster*, which seem specially liable to variation; for example, in the museum there are two branches, one with 8 cones, of which there are 6 normal, with $\frac{8}{21}$ spiral, one with an $\frac{8}{29}$, and one with a $\frac{5}{23}$ arrangement; the other with 5 cones, of which there are 2 normal, two with an $\frac{8}{29}$, and one with what seems to be a very rare arrangement, viz. a $\frac{5}{22}$ spiral, a member of a series whose terms would run as follows, $\frac{1}{4}$, $\frac{2}{9}$, $\frac{3}{13}$, $\frac{5}{22}$, $\frac{8}{35}$, etc., these fractions representing the values of the successive convergents in the continued fraction—

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* Trijugate spirals have also been noted as occurring in Pine-cones (L. and A. Bravais, "Sur la Disposition des Feuilles," Ann. des Sc. Nat. 2nd series, vol. vii. p. 102). And Dr. Dickson has, since the Society's meeting, observed a cone of *Abies excelsa*, where the arrangement is a trijugate $\frac{8}{21 \times 3}(=\frac{8}{63})$ spiral.

† Examples of this series have been observed by Bravais (l. c. p. 93) in *Pinus maritima*, *Dipsacus*, etc.

$$\cfrac{1}{4+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\ldots}}}}$$

—Professor Dickie presented specimens of *Rhodymenia palmata* found growing on an iron chain submerged for five months in six fathoms in the Bay of Nigg, near Aberdeen, also specimens of *Polysiphonia Brodiæi* found growing on a piece of hempen rope attached to the same chain.—Mr. Sadler presented specimens of *Ulva crispa*, and recorded its occurrence in great profusion at the foot of a wall leading to Warriston Cemetery, Edinburgh.

Botanical News.

The Trustees of the British Museum have appointed Mr. William Carruthers to be Keeper of the Botanical Department in the place of Mr. J. J. Bennett, who recently retired. None of the readers of this Journal require to be informed of the very valuable additions to our knowledge of plant structure which have been made by Mr. Carruthers; many of his researches on fossil plants have been first published in our pages, and the yearly indexes show other important contributions from his pen. With the prospect of increased accommodation in the new Natural History Museum, abundance of opportunity for developing the great resources of the department will be afforded to Mr. Carruthers and his assistants.

Mr. Baker has commenced in the 'Gardener's Chronicle' a synopsis of the genus *Lilium*. He separates as a subgenus (*Notholirion*) the Himalayan *L. roseum;* and under the name *L. Hookeri* describes another species of the same subgenus from Sikkim.

Under the title 'Bristol Pharmacology,' Mr. Stoddart, of Bristol, is publishing in the 'Pharmaceutical Journal' a series of very interesting notes on the medicinal native plants growing round that city, which are very well worth perusal by students of our flora.

Dr. Asa Gray has recently given us a reconstruction of the Order *Diapensiaceæ*. He associates with *Diapensia* and *Pyxidanthera* in this small Order *Shortia* and *Galax*, which have been referred to various natural families. We are also indebted to him for an excellent revision of the *Polemoniaceæ* of N. America, of which he describes 109 species under four genera.

'The Year-Book of Pharmacy for 1870, with the Proceedings of the British Pharmaceutical Conference' held at Liverpool last year, has reached us. It forms a volume of some 600 pages, filled with a very miscellaneous assemblage of papers and notes on all subjects connected with the materia medica in its largest sense, both British and foreign, and will be found worthy of perusal by botanists as well as pharmacentists. The arrangement of the material seems to be not based on any evident system, which renders the book somewhat difficult of consultation; but it would be ungracious to complain of this, since the editor, Mr. J. C. Brough, is stated in the Preface to have been seriously ill during the progress of the book through the press.

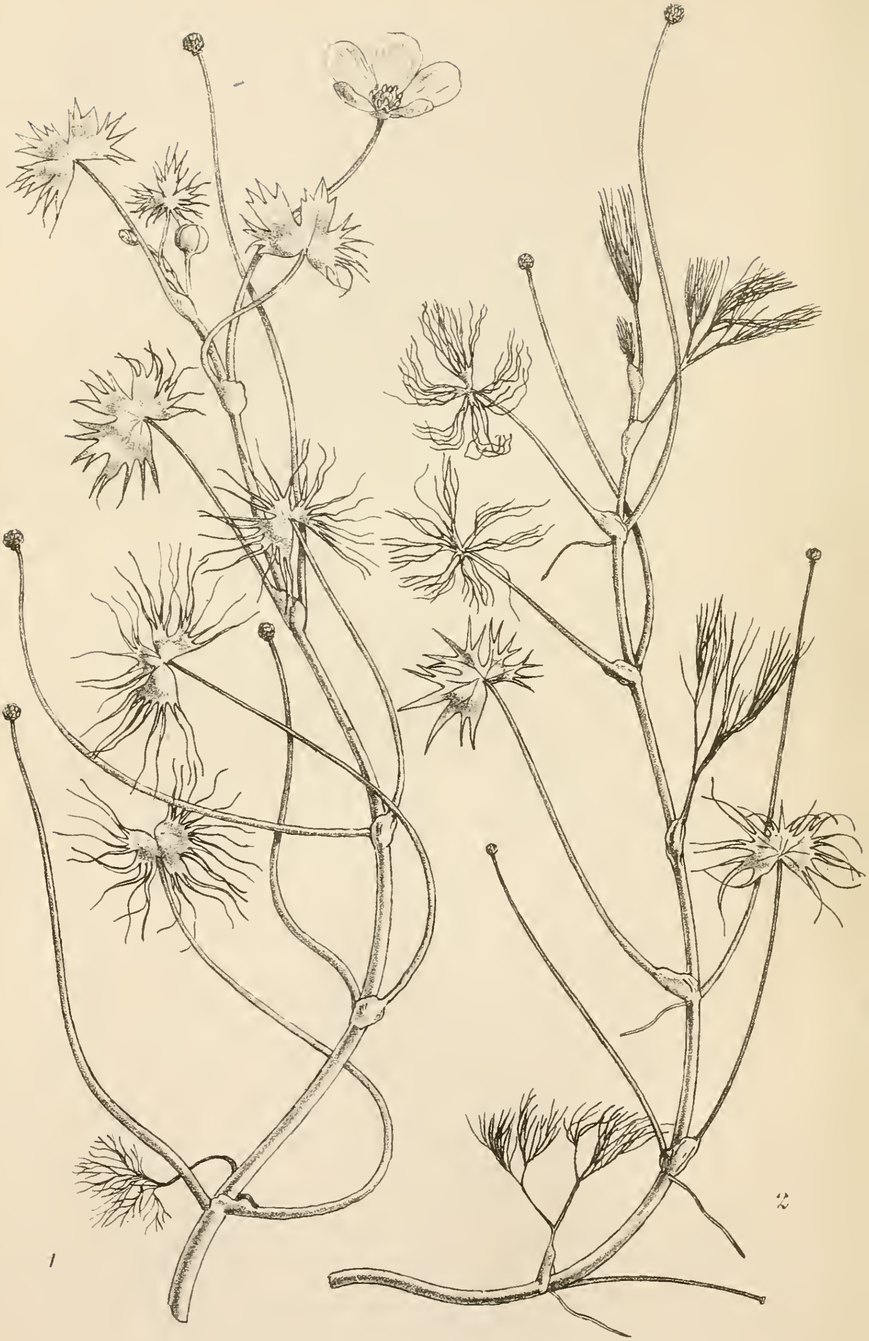
Our obituary this month is unhappily a long one. Dr. F. A. W. Miquel, Professor of Botany in the University of Utrecht, and Curator of the Royal Herbarium at Leyden, succumbed to an affection of the chest in the end of last January. He ranked among the most distinguished botanists of Europe, and the great advantages of the Leyden Herbarium were turned to excellent account by him in the elucidation of the botany of the East Indian Islands, Japan, and New Holland. The 'Annales Musei Botanici Lugduno-Batavi,' commenced in 1863, and published in folio parts, of which forty, forming four volumes, have appeared, and the 'Flora Indiæ Batavæ' are his most important works; but Professor Miquel was the author of Monographs of the *Piperaceæ*, *Cycadeæ*, *Ficus*, *Cacti*, *Casuarinæ*, etc., and of very numerous papers in the transactions of the learned societies of the Continent, no less than 108 articles standing under his name in the Royal Society's Catalogue. By his death science loses an eminent votary, and the botanists of this and other lands a fellow-worker who was always ready to place the information which he possessed at their service.

Dr. Franz Lagger, of Freiburg, who paid much attention to the flora of Switzerland, and added a few species to it, died in the early part of the year.

Eugène Coemans died at Ghent in January last. He was a lay abbot, but devoted himself to botanical studies. His earliest memoir was on some critical Belgian Cryptogams, published in 1858; and for several years he directed his attention to these plants, especially to the Fungi, and published several systematic and structural papers on that Order. More recently he became engrossed with the elucidation of the fossil plants of Belgium, and contributed several valuable papers to different periodicals, besides accumulating an extensive series of notes and drawings for a general work on the subject. These he has left to the Natural History Museum of Belgium. The most important of his papers is the description of a singular gymnospermous flora of Cretaceous age at Hainault, which was noticed in this Journal (Vol. V. p. 182). His memoirs on the genera *Sphenophyllum*, *Annularia*, and *Asterophyllites*, cleared up the confusion into which these forms of foliage had got; and, although at first he held them to be most probably phanerogamous plants, he subsequently adopted the views of Mr. Carruthers, and in our pages published (Vol. VII. p. 337) his estimate of the classification and relation of those forms. His death is a great loss to science, especially to science in Belgium.

We also regret to record the death, in his forty-second year, of Mr. T. W. Gissing, which took place at Wakefield on December 28. Mr. Gissing was the author of a 'Flora of Wakefield' (noticed in Vol. V. p. 346), and has also contributed to our pages.

COMMUNICATIONS have been received from:—Prof. Thiselton Dyer, A. G. More, Rev. J. M. Crombie, Rev. W. A. Leighton, Prof. Church, A. W. Bennett, W. Carruthers, J. Sadler, C. Bailey, Miss Gifford, J. Britten, etc.



W. G. Smith del et lith.

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Original Articles.

ON THE FORMS AND DISTRIBUTION OVER THE WORLD OF THE BATRACHIUM SECTION OF RANUNCULUS.

By W. P. Hiern, M.A.

(*Concluded from p.* 69.)

(Plate CXV.)

12. TRIPHYLLUS.

R. triphyllos, Wallr. in Linnæa, vol. xiv. p. 584 (1840). *R. Petiveri, β. major*, Koch, Syn. Fl. Germ. et Helvet. ed. ii. p. 13 (1843). *R. heterophyllus*, Fries (part) (1845). *Batrachium heterophyllum*, Fries (part) (1846). *R. aquatilis*, var. *δ. tripartitus*, Koch in Sturm. Deutschl. Fl. hf. 67. f. (1835). *R. Friesii*, Beurl. Botan. Notis. 1852, p. 156, non Hartm.

Occurs in W. Russia, England (Surrey, state with small flowers, approaching *Godronii*, but with glabrous carpels), France. Wallroth gives three varieties,—*α. obtusiloba*, lobes of floating leaves blunt; *β. acutiloba*, lobes of floating leaves acute; *γ. schizoloba*, lobes of floating leaves usually stalked, deeply and irregularly divided in linear segments. Differs from *elongatus* by its glabrous carpels.

> *Batrachium heterophyllum*, S. F. Gray, Nat. Arr. Brit. Pl. vol. ii. p. 721 (1821). *Ranunculus aquatilis*, Godr. Essai (1839). Forms 13–19.
>
> *R. peltatus*, Schrank, Baier. Fl. vol. ii. p. 103 (1789). *R. hydrocharis*, A. *heterophyllus*, *β. peltatus*, Spenner, Fl. Frib. (1829). *Batrachium peltatum*, Fries, Sum. Veg. Scand. i. p. 141, and var. *isophyllum*, Fr. l. c. (without capillary leaves) (1846). *Batrachium setigerum*, Fries, Bot. Utfl. (1852, 3), ex Hartman (1861). Forms 13–16. Fig.—Rchb. Fl. Germ. 3. 3, "*R. aquatilis, β. heterophyllus, subpeltatus*; *R. aquatilis, terrestris, heterophyllus*," (1838). Schkuhr, Handb. t. 152, "*R. heterophyllus*" (1808). Cosson and Germ. Atl. t. 2. f. 3. According to Fries, floating leaves are necessary for the production of flowers in *peltatus*, in consequence of the peduncles springing only from the axils of the floating leaves; this statement, however, does not agree with my experience.
>
> The very remarkable form figured in plate 115 has peltate leaves, very finely and deeply decomposed so as to simulate submersed leaves. It was gathered by Mr. P. Gray in August, 1845, from the margin of the Castle Loch, Lochmaben, Dumfries, Scotland; it is best referred to *R. peltatus*, Schrank, var. *fissifolius*, but it has some approach to *R. Petiveri*, Koch. *R. (Batrachium) hypotrichus*, Turcz. in Bull. de Mosc. vol. ii. p. 275 (1854), has its floating leaves pilose below and subcoriaceous; it appears to be referable here and to approach *R. trinacrius*; it may, however, be a state of *radians*.

13. ELONGATUS.

R. elongatus, *Batrachium elongatum*, F. Schultz ! in 'Billotia,' vol. i. p. 113. n. 3802 (1869). *R. aquatilis*, *γ. quinquelobus*, Koch in Sturm. Deutschl. Fl. Hf. 67. f. (1835), seems scarcely to differ, except that the lobes are more uniformly rounded and nearly equal.

Occurs in Lapland (Fellman ! 3, a poor specimen, from the Arctic regions, seems to belong here), England (Hampshire !, Lancashire *quinquelobus*), Wales, France, Germany, Spain. *R. aquatilis*, *heterophyllus*, *subtruncatus*, Rchb. Fl. Germ. vol. iii. p. 3, is intermediate between *elongatus* and *truncatus*.

14. PENICILLATUS.

Batrachium penicillatum, Dumort. Monogr. Batr. p. 12 (1863). *R. aquatilis*, *a. longifolius*, Rossmann, Beitr. Kenntn. Wasserhahn. p. 58 (1854). *R. aquatilis*, *β. heterophyllus*, *subtruncatus*, *pleiopetalus*, Rchb. Fl. Germ. 3. t. 3 (1838). *R. pseudofluitans*, Bab., *minore parte* (1867). *R. peltatus*, *γ. pseudofluitans*, Syme, part (1863).

Occurs in England, Ireland, Belgium, France, Germany, and probably in other countries. Differs from *fluitans*, with which it is likely to be confounded, by its hairy receptacle, and from *pseudofluitans* by the presence of floating leaves. The petals are occasionally more than five in number, as is also the case in *fluitans*. E. Fries in 'Botaniska Notiser' for 1845, p. 122, reports "*Batrachium* quoddam singulare *penicillatum*" from the Malar Lake, in Sweden, having leaves with long petioles, and with very numerous but quite short setaceous segments in a very dense pencil. He was uncertain whether these characters would prove constant, and I have no further information regarding the plant.

15. FLORIBUNDUS.

R. aquatilis, *a. peltatus*, Koch in Sturm, Deutschl. Fl. Hf. 67. f. (1835). *R. aquatilis*, a. *cordatus*, Döll, Rheinisch. Fl. p. 549 (1843). *R. floribundus*, Bab. in Ann. Nat. Hist. ser. 2. vol. xvi. p. 397 (1855). *R. trinacrius*, E. and A. Huet du Pavillon in Plant. Sic. Exsicc. n. 1 (1856, state deprived of submersed leaves). *Batrachium aquatile* and *floribundum*, Dumort. Monogr. Batr. p. 12 (1863). *R. peltatus*, *β. floribundus*, Syme (1863). Fig.—Fl. Dan. t. 2416; Eng. Bot. Suppl. 2969.

Occurs in England, Scotland, Ireland, France, Sicily, Spain, Portugal, S. E. Europe, Smyrna, Algiers, etc. *R. aquaticus*, var. *trilobus*, Frivaldezky MS. Rumelia. 1837. A common and widely distributed form, especially in Europe.

16. TRUNCATUS.

R. aquaticus, *β. truncatus*, Koch in Sturm, Deutschl. Fl. Hf. 67 f. (1835). *R. peltatus*, Bab. l. c. 1855 (nearly). *Batrachium truncatum*, Dumort. Monogr. Bat. p. 11 (1863). *R. peltatus*, *a. vulgaris*, Syme (1863) (nearly). Fig.—Eng. Bot. Suppl. t. 2965 (not good).

Occurs in West Russia (Herb. Fl. Ingric. Cent. ix. n. 12 !), Britain, Belgium, France, etc., Teneriffe (state always with glabrous carpels, often with very large flowers and numerous veins on the petals, approaching *penicillatus*, E. Bourgeau, Pl. Canar. n. 407 !).

R. diversifolius, Schrank, Baier. Fl. p. 103 (1789). *Batrachium heterophyllum*, Fries, Sum. Veg. Scand. i. p. 140. part (1846). *R. hydrocharis*, A. *heterophyllus*, *a. vulgaris* Spenner, Fl. Frib. (1829). Forms 17–19.

17. RHIPIPHYLLUS.

R. rhipiphyllus, Bast in Boreau, Fl. Cent. Fr. ed. 3. vol. ii. p. 11 (1857).

France. A specimen with very few submersed leaves, and with only 3-5 veins on the petals, from Leipzig in Hb. Kew, labelled *R. aquatilis*, var. *micranthus*, probably is a state of this form, also some British specimen; but I have not seen an authentic specimen.

18. RADIANS.

R. radians, Revel in Act. Soc. Linn. Bord. vol. xix. p. 114, f. (1853). *R. heterophyllus*, Bab. part (1855).

Occurs in Scandinavia, Scotland, England, Ireland, France, Switzerland, Spain (weak state, with leaves approaching those of *floribundus*), etc. Not uncommon, I believe, in the North of England. I have it from Lancashire, Staffordshire, and Cambridge.

19. GODRONII.

R. Godronii, Gren. in Schultz Arch. pp. 169, 172 (name only), (1850). *R. aquatilis, β. brevifolius*, Rossmann, Beitr. Kenntn. Wasserhahn, p. 58 (1854).

Occurs in England (Warwickshire!) and France, and probably elsewhere. Professor Babington, in 1855, united this form with *R. Drouetii*, and now he unites it with *R. trichophyllus*. Floating leaves tripartite with cuneate and incise or crenate lobes, membranous and quite glabrous, or occasionally with a few scattered weak appressed hairs beneath; flowers usually smaller than in *radians;* submersed leaves finely capillary; carpels more or less hispid; fruit-receptacle rounded and hairy.

R. pantothrix, Brot. Fl. Lusit. vol. ii. p. 375 (1804). *R. fluviatilis*, Wahl. Helvet. n. 597. p. 109 (1813), non Web. *R. hydrocharis*, B. *homoiophyllus, β. γ. ε. ζ*, Spenn. Fl. Frib. (1829). All Indian specimens belong to this group, and all American ones except those which belong to *R. hederaceus*, L. Forms 20–35.

R. fœniculaceus, Gilib. Fl. Lith. vol. v. p. 262 (1782). *R. aquatilis, γ. fœniculaceus*, Hagen, Ranunc. Pruss. (1783) in Ludw. Del. Opusc. p. 488 (1790). *R. aquatilis*, Web. in Wigg. Prim. Fl. Holsat. p. 42 (1780). Forms 20–34.

20. CIRCINATUS.

R. aquatilis, β, Linn. Sp. Pl. p. 781 (1753). *R. aquatilis*, B. *millefolius*, Liljeblad, Sw. Fl. p. 229 (1792), ex Schlechtendal. *R. circinatus*, Sibth. Fl. Oxon. p. 175 (1794). *R. aquatilis, α. orbiculatus*, Schum. En. Pl. Saell. p. 171 (1801). *R. stagnatilis*, Wallr. Sched. Crit. p. 285 (Lower leaves subferruginous 1822). *R. aquatilis, δ. stagnatilis*, De Cand. Prod. vol. i. p. 27 (1824). *R. rigidus*, Roth, En. Pl. Phænog. Germ. I. ii. p. 633 (1827), non Pers. nec Godr. *R. hydrocharis*, B., *homoiophyllus, γ. cæspitosus*, Spenn. Fl. Frib. p. 1008 (1829). *R. divaricatus*, Koch in Sturm. Deutschl. Fl. H. 67, fig. (1835), non Schrank. *Batrachium circinnatum*, Spach, Hist. Nat. Veg. vol. vii. p. 201 (1839), Fries, Hb. Norm. fasc. 9. n. 29 (specimen, 1846). *Batrachium divaricatum*, Schur. Enum. Pl. Transsilv. 12 (1866). Fig.—Godr. Essai, f. 7; Eng. Bot. t. 2869; Fl. Dan. t. 2236; Rchb. Fl. Germ. 3. 2; Cosson and Germ. Atl. t. 1. f. 9; Schkuhr, Handb. t. 152.

Occurs in Scandinavia, Belgium, Russia, England, Scotland, Ireland, France, Germany, Switzerland, Tyrol, Italy. A Swedish form approaches *conferroides*. This is one of the best marked and most distinct, but I cannot separate it specifically from others. The synonymy is much confused with *cæspitosus,* and somewhat with *trichophyllus.*

21. BUNGEI.

R. hydrophilus, Bunge, En. Pl. Chin. p. 2 (1831), non Gaudich. *R. Bungei,* Steud. Nomencl. Bot. 2. 433 (1841).

Occurs only in China. This is without exception the most distinct and the least connected by intermediate forms of all the members of this group; but as I have seen no other specimens from China, I do not think it safe to keep this as a separate species while so many other diverse forms are combined. When more specimens are examined from China, we shall be in a better position to judge.

> *R. pectinatus,* Dubois, Orl. ed. 2. 1030 (1833). *R. aquatilis,* γ. L. (1753). *R. peucedanifolius,* All. Fl. Piedmont, n. 1469 (1785), teste Bert. non Gilib. *Batrachium pantothrix,* S. F. Gray, Nat. Arr. Br. Pl. 2. 722 (1821). *R. aquatilis,* var. *diffusus,* With. Br. Pl. vol. iii. p. 682 (1830). *R. pantothrix,* Bert. Fl. Ital. vol. v. p. 575 (1842). Forms 22–34.

22. CÆSPITOSUS.

R. cæspitosus, Thuill. Fl. Par. ed. 2. p. 279 (1799), non *R. cespitosus,* Wall. List. n. 4701 (1828). *R. pumilus,* Poir. Enc. vol. vi. p. 133 (1804), non Thuill. *R. aquatilis,* B. *homoiophyllus, β. abrotanifolius,* Wallr. Sched. Crit. 283 (1822). *R. Bauhini, β. terrestris,* Tausch. Flora, xvii. ii. 526 (1834). *R. aquatilis,* γ. *rigidifolius,* Kunth, Fl. Berol. vol. i. p. 14 (1838), excl. Synon. *Batrachium aquatile,* γ. *radicans,* Spach, Hist. Nat. Veg. vol. vii. p. 201 (1839). *R. aquatilis,* δ. *succulentus,* Koch, Syn. Fl. Germ. et Helvet. ed. 2. p. 13 (1843). Fig.—Godr. Essai, f. 6; Cosson and Germ. Atl. t. 2. f. 5; Rchb. Fl. Germ. 3. 3. "*R. aquatilis,* γ. *terrestris homophyllus*" (1838).

Occurs in Sweden, England, Wales, France, Germany, Transylvania Greece, Portugal, India, Columbia, N. America, etc. This is the subterrestrial state of many of the following forms.

> *R. capillaceus,* Thuill. Fl. Par. 2. ii. p. 279 (1799). *Batrachium aquatile,* α. *trichophyllus,* Spach, Hist. Nat. Veg. vol. vii. p. 200 (1839). *R. aquatilis,* α. *pantothrix, capillaris,* Rchb. Fl. Germ. 3. 3 (1838). *R. hydrocharis,* B. *homoiophyllus, capillaceus,* Spenn. Fl. Frib. (1829). Forms 23–34.

23. LONGIROSTRIS.

R. longirostris, Godr. Essai, f. 9 (1839). *R. aquatilis,* var. (*trichophyllus?*), George Lawson in Monogr. *Ranunculaceæ,* Dom. Canada and Br. Amer. Art. ii. p. 42, 1869 (some or all of the localities named).

Occurs exclusively in North America. Canada West, Macoun!; Drummond!; New Mexico; Lexington, Kentucky, Short! Peter!; Columbia; St. Louis, Missouri; California, Bigelow! A specimen from Saskatchewan, British North America, collected by E. Bourgeau, probably belongs to this form. Specimens from Tobacco plain, Kootenay, British Columbia, collected by Dr. Lyall, and from Rock river, Hudson's Bay territory, collected by Burke, are smaller forms, and are even deficient in the long beak on the carpels; they appear to hold an intermediate position between *longirostris* and *circinatus,* and the foliage approaches that of *Rionii.* Stamens 12–15, carpels 8–10. In running water.

> *R. rigidus,* Pers. in Usteri Annal. 14. 38, 39 (1795), non Godr. (1839), nec Roth. *R. abrotanifolius,* Auct. in Pers. Syn. Pl. 2. 106 (1807). Forms 24–27.

24. ASPERGILLIFOLIUS,

Batrachium aspergillifolium, Dumort. Monogr. Rénonc. 14 (1863).

Originally noticed in Flanders. I have not seen an authentic specimen. This form, or one closely related to it, occurs in England, and also in the south of France. Resembles *circinatus* by its distant and rigid leaves with regular outline, but differs from it by its shorter peduncles, and by the lateral position of the leaves, not surrounding the stem. It also approaches *trichophyllus*, between which and *circinatus* it is intermediate.

R. paucistamineus, Tausch in Flora, vol. xvii. ii. 525 (1834). *Batrachium aquatile*, var. *trichodes*, Döll ex Martens et Kemmler, Fl. Würt. et Hohenzoll. p. 8 (1865). *Batrachium paucistamineum*, Schur. Enum. Pl. Transsilv. p. 12 (1866). Includes *Drouetii*, *confervoides*, and at least the smaller-flowered states of *trichophyllus*. Forms 25, 28, 29.

R. aquatilis, *β. phellandrifolius*, Schum. En. Pl. Saell. vol. i. p. 171 (1801), includes these forms and probably also *submersus*. *R. stenopetalus*, Syme in Rep. Lond. Exch. Club, 1869, p. 7, non Hook. Ic. Pl. t. 677 (1844), was defined as a species to include those in the third edition of 'English Botany,' named *trichophyllus*, *Drouetii*, *heterophyllus*, Syme; that is, the forms *radians*, *Godronii*, *trichophyllus*, *Drouetii*, and *submersus* of this paper. It is a useful name to apply to certain intermediate states that cannot be further identified with any other published name.

25. TRICHOPHYLLUS.

R. trichophyllus, Chaix in Villars, Dauph. vol. i. p. 335 (1786). *R. divaricatus*, Schrank, Baier. Fl. vol. ii. p. 104 (1789), non Koch, etc. *R. aquatilis*, *ε. pantothrix*, Koch in Sturm. Deutschl. Fl. hf. 67. f. (1835). *Batrachium bipontinum*, F. Schultz in Gren. et Godr. Fl. Fr. vol. i. p. 24 (1848). *Batrachium villosum*, F. Schultz, l. c. *Batrachium trichophyllum*, Van den Bosch, Fl. Bat. Prodr. 5 (1850). Fig.—English Botany, Suppl. t. 2968; Fl. Dan. t. 2357; Cosson and Germ. Atl. t. 2. f. 4.

Occurs in Norway, Sweden, Scotland, England, Ireland, Belgium, France, Brunswick, Switzerland, Bavaria, Italy, S. E. Australia (state very near this form), Rocky Mountains and Oregon, (Nuttall!; state near *cæspitosus*), India (a weak state approaching *Drouetii*). A state with long peduncles occurs in Sweden; it approaches *marinus*, but the carpels are hairy. According to Boreau, *R. Bauhini*, Tausch in Flora. vol. xvii. ii. p. 525 (1834), belongs to this form. Var. *brachypus*, Hook. and Arn. Bot. Beech. p. 316 (1841), has the peduncles and internodes shorter than the leaves, which have very slender segments; it occurs in California, Douglas! A state with rather more rigid and less finely divided and submersed leaves, and with a few subtripartite floating leaves, occurs also in California.

26. RIGIDUS.

R. rigidus, Godr. Essai, f. 10 (1839), non Pers., nec Roth.

Occurs at the Cape of Good Hope (Drége! 7605), India (Stewart! 5000 ft. alt.; a small form with fewer carpels and longer peduncles, but nearer to this form than to any other). Specimens from the Cape show a complete succession of states from *rigidus* to *Drouetii*.

27. Rionii.

R. Rionii, Lagger in Flora, vol. xxxi. i. pp. 49, 50 (1848). *Batrachium Rionii*, Nyman, Syll. Fl. Europ. p. 174 (1854–55). *R. Bauhini*, var. *natans*, Tausch in Flora, vol. xvii. ii. p. 526 (1834).

Occurs in Sweden (teste Hartmann), Switzerland, N. W. India (Edgeworth !), and Afghanistan (Griffith !).

R. flaccidus, Pers. in Usteri Annal. vol. xiv. pp. 38, 39 (1795). *R. aquatilis*, *β. capillifolius*, Kunth, Fl. Berol. vol. i. p. 14 (1838). Forms 28–31.

28. confervoides.

R. confervoides, Fries, Sum. Veg. Scand. vol. i. p. 139 (1846). *Batrachium confervoides*, Fr. Bot. Not. An. 1845, p. 121. *R. paucistamineus*, var. *borealis*, Beurl. Bot. Not. 1852, p. 156.

Occurs in Iceland (Paulson !), Finland, Norway, Lapland, Sweden, Abyssinia (Schimper ! sect. ii. 1304 part, approaching *Drouetii*), Pend Oreille River, Washington, U. S. (Dr. Lyall !), Lake Winnipeg (Douglas !). A curious bifurcation occurs at the apex of a peduncle on a specimen from Alatan Mountains, Russia in Asia. *R. aquatilis*, *γ. sajanensis*, Regel and Radde in Regel, Bot. Ost-Sibierien, vol. i. p. 39 (1861), "in alpibus Sajanensibus," is rather a larger form. Var. *eradicatus*, Loestad. (1842): "pusillus, floribus minimis, foliis omnibus tenuissime capillaceis. Sub ipsa aqua. Floret in Lapponia arctica." *Batrachium eradicatum*, Fr. (name only) in Bot. Not. 1843, p. 114.

29. Drouetii.

R. Drouetii, F. Schultz, teste Godr. in Gren. and Godr. Fl. Fr. vol. i. p. 24 (1848). *Batrachium Drouetii*, Nym., Nya Bot. Not. An. 1852, p. 98. *R. affinis*, F. Schultz in Fl. vol. xxiv. ii. p. 558 (1841), non R. Br., was a name given provisionally, in order to secure priority of publication for some supposed new species; I can find no more information about it, but very possibly the plant subsequently named *Drouetii* was meant.

Occurs in Sweden, Norway, Scotland, England, France, Switzerland, Prussia, Austria, Tyrol, Piedmont, Sicily, Savoy, Turkey in Europe, Westphalia, Caucasus, Turcomania, India, Abyssinia (Schimper ! sect. ii. n. 1304, part), S. Africa (Ecklon !; form approaching *confervoides*), Aleutian Isles, British Columbia (Wood !), Lower Frazer River, Columbia (Dr. Lyall !), Cascade Mountains, U. S. (Dr. Lyall !; one piece differs by presence of floating leaves), Bolivia, S. America (Mandon ! 873; alt. 3900 metres; elongated state). *R. lutulentus*, Song. and Perrier in Billot, Annot. Déc. 1859, is a pale green state, with slender leaves, and with the habit of *confervoides*; it occurs in Savoy and Switzerland, 7000 ft. alt. Some British specimens are very close to it. Var. *cabomboides*; an elongated plant, collected by Gunn in Lake River, Grindelwald, and at Formosa, Tasmania, where it grows among pebbles, at the bottom of the stream in a matted mass. It flowers under the water. A similar form from Sinaja Sorka is in Hb. Pallas.

30. submersus.

R. aquatilis, var. *submersus*, Godr. in Gren. and Godr. in Fl. Fr. vol. i. p. 23 (1848). *R. heterophyllus*, Bab. part (1855). *R. aquatilis*, *ε. homoiophyllus*, Boreau, Fl. Cent. Fr. ed. 3. vol. ii. p. 11 (1857). *R. aquatilis* (*R. submersus*), Carion, Cat. Saône et Loire in Bull. Soc. Bot. France, vol. vi. p. 498 (1859).

Occurs in England, Ireland, Armenia, Syria, Bucharia, India, South

Africa (Drége! 7606, Cooper, 731), Boston, U.S., and is in all probability widely distributed. Differs from *Drouetii* by its larger size with bigger flowers, and more elongated submersed leaves, occupying an intermediate position between the latter and *pseudofluitans*.

31. PSEUDOFLUITANS.

R. heterophyllus, Bab. part (1855) ex Syme. *Batrachium aquatile*, b. *rivulare*, Schur. Enum. Plant. Transsilv. p. 11 (1866). *R. peltatus*, γ. *pseudofluitans* (impropr. "*R. pseudo-fluitans*, Newbould, ms."), Syme, Eng. Bot. ed. 3. vol. i. p. 20, part (1863). *R. pseudofluitans*, Bab. (impr. Newb.) Man. Brit. Bot. ed. 6. p. 7, majore parte (1867).

Occurs in England and Thibet (T. Thomson! 14,500 ft. alt.), and probably in many countries of Europe, specimens of it being frequently called *R. fluitans*, Lam., which it approaches very closely. Generally, however, it differs from *fluitans* by more slender leaf-segments, and especially by its hairy not glabrescent fruit receptacle. It differs from *penicillatus*, from which Mr. Syme and Professor Babington have not distinguished it, by the absence of floating leaves, and usually by a different habit.

32. SPHÆROSPERMUS.

R. sphærospermus, Boiss. et Blanche in Boiss. Diagn. ser. i. vol. v. p. 6 (1856). *R. aquatilis*, γ. *sphærospermus*, Boiss. Fl. Orient. p. 23 (1867).

Occurs in Syria (near Damascus, Gaillardot!, state with carpel-heads ovoid). A plant gathered by Dr. Schlafli! n. 34, from the Euphrates is best referred here; also a plant gathered in Warwickshire by Dr. Kirk! This form bears a general resemblance to *trichophyllus*, but the stem is more succulent, the flowers are larger, and on longer and thicker peduncles, and the carpels more numerous. It also bears some resemblance to *pseudofluitans*.

33. SALSUGINOSUS.

Batrachium salsuginosum, Dumort. Monogr. Batr. p. 14 (1863) (non *R. salsuginosus*, Pall., nec Wall. List. 4708).

Occurs in Sweden, Scotland, England, Belgium, France, Greece, Palestine, etc. Differs from *confusus* by the absence of floating leaves.

34. MARINUS.

R. marinus, Arrh. and Fr. in Fr. Mant. iii. p. 52 (1842). *Batrachium marinum*, Fr. l. c. p. 51 (1842); Herb. Norm! fasc. 9. n. 28 (specimen).

Occurs in Norway, Sweden, Denmark, Finland, West Russia (Herb. Fl. Ingric. Cent. viii. n. 12!), Scotland, England, Ireland, France, etc. A curious state, best referred to this form, occurs in England (N. Devon!) and Sweden! with elongated, rather stout, and subparallel leaf-segments and small flowers with hairy fruit-receptacles. It approaches *fluitans* and *pseudofluitans*. The Devonshire plant occasionally has floating leaves, and then it would belong to *Baudotii*; it grows in a mill-stream, liable to be mingled with tidal water.

35. FLUITANS.

R. aquatilis, δ, Linn. Sp. Pl. p. 781 (1753). *R. fluitans*, De Lamarck, Fl. Fr. vol. iii. p. 184 (1778). *R. fluviatilis*, Weber in Wiggers Fl. Holsat. p. 43 (1780) non Bigelow. *R. peucedanifolius*, Gilibert, Fl. Lith. vol. v. p. 262 (1782). *R. aquatilis*, β. *peucedanifolius*, Hagen, Ranunc. Pruss. (1783) in Ludw. Del. Opusc. p. 188 (1790). *R. macrophyllus*, Pers. in Ust. Ann. 14, 39 (1795). *R. peucedanoides*, Desf. Fl. Atlant.

vol. i. p. 444 (1798). *R. pantothrix*, *γ. peucedanifolius*, De Cand. Syst. Veg. vol. i. p. 236 (1818). *Batrachium fluviatile*, S. F. Gray, Nat. Arr. Brit. Pl. vol. ii. p. 722 (1821). *B. peucedanifolium*, Dumort. Prodr. Fl. Belg. p. 127 (1827). *R. hydrocharis*, B *homoiophyllus*, *ζ. peucedanifolius*, Spenn. Fl. Frib. (1829). *Batrachium fluitans*, Fries, Sum. Veg. Scand. i. p. 26 (1846). *R. fluitans*, *a. fluviatilis*, et *β. terrestris*, Godr. in Gren. and Godr. Fl. Fr. vol. i. p. 26 (1848). *R. Bachii*, Wirtgen, Verh. Pruss. Rhnld. vol. ii. p. 22 (1845). *Batrachium Bachii*, Wirtgen, l. c. iii. p. 8 (1846). Fig.—Cosson and Germ. Atl. t. 2. f. 1, 2 (flore pleno); Fl. Dan. t. 376 (?); Godr. Essai, f. 8; Eng. Bot. Suppl. t. 2870 (β.); Rchb. Fl. Germ. (flore pleno); Sturm. Deutschl. Fl. H. 67 (flore pleno).

Occurs in Denmark, England, Ireland, Belgium, France, Prussia, Switzerland, Bavaria, Hungary, Bohemia, Transylvania, Styria, Serbia, Spain, Portugal, Italy, Mid-Russia teste Nyman, North Africa. There are three varieties: *a. minor;* flowers of moderate size with 5 petals, aquatic. (*R. Bachii*, Wirtgen.) *β. maximus;* flowers large, often with more than 5 petals, aquatic. *γ. terrestris;* subterrestrial. (*R. hydrocharis*, B. *homoiophyllus*, *ε. trisectus*, Spenn. l. c. *R. fluitans*, *β. terrestris*, Godr. l. c.) A state approaching *Baudotii* was raised by seed from the ordinary form of *fluitans* by Koch. See *R. fluitans foliis fluitantibus*, figured in Sturm. l. c.

Excluded species.

Ranunculus aconitifolius, L., Visiani in Flora Dalmatica, vol. iii. p. 82 (1850), where it is placed in the section *Batrachium*, belongs to section *Hecatonia* of *Ranunculus.*

R. aquaticus, cotyledonis umbilicato folio, Col. Ecphr. vol. i. p. 315. t. 316 (1616). Linnæus quoted this plant in uncertain conjunction with his *aquatilis.* It is *Hydrocotyle vulgaris*, L.

R. biternatus, Sm. in De Cand. Syst. Veg. (1818). *Batrachium biternatum*, J. S. Presl, 'Prirozenosti Rostlin,' vol. i. p. 49 (1823), belongs to section *Hecatonia.*

Ranunculus fluviatilis, Bigelow, 'Florula Bostoniensis,' ed. 1. p. 139 (1814) non Web. (1780), is *R. multifidus*, Pursh, *R. Purshii*, Richardson, and belongs to section *Hecatonia.*

Batrachium sceleratum, Hartman, Skand. Fl. 8th ed. p. 94 (1861), belongs to section *Hecatonia.*

Alphabetical Index of Names with numerical references to the co-ordinate forms recognized in this paper.

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The ultimate co-ordinate forms recognized in the previous notes must not be considered as generally equivalent to sub-species; in many cases, at least, their characters depend upon purely external or accidental causes and the plants are not genetically distinct. Thus the peculiarity of the form *cæspitosus* is manifestly due to the dryness of its habitat, whilst the differences between several forms with floating leaves and the corresponding ones without floating leaves are not likely to be of even sub-specific value. On the other hand, some forms retain their characters through very diverse circumstances, and they can, for many purposes, be regarded as true species; indeed, it is only by taking a wide and comprehensive view of the group in general, or by comparing some cases of approach on the part of others that certain of the forms would appear at all likely to belong to the same aggregate species. Some little has been done by growing the plants from seed towards showing that certain forms are possibly derived from others; but much more is required to prove that all the forms can be so altered by cultivation or otherwise; and moreover, it is quite likely that no amount of cultivation or manipulation could, in any reasonable time, complete the proof that all the forms are interchangeable by descent. With the object of clearing up many doubts, it is very desirable that further experiments should be made to test their capacity for variation due to age, climate, season, kind of water and strength of current, descent, and other circumstances; that more specimens should be brought from those parts of the world that at present have yielded few and isolated forms; and that, whenever any person meets with a state different from the well-known forms, specimens should be forwarded to some botanist who is well acquainted with the plants and takes a special interest in them.

For complete synonymy the ante-Linnean names should be quoted; but as these consist in many cases of long phrases, and have quite dropped out of common use, it has been thought better not to encumber these notes with so much extra matter as the bare enumeration of them would involve, and that for so little practical utility. It is interesting, however, to know that the old botanists, from the time of Dioscorides downwards, recognized and named several of the forms; indeed, about seventy-five ante-Linnean names are extant. They relate to what have latterly been called *R. hederaceus*, L., *R. aquatilis*, L., *R. heterophyllus*, Web., *R. peltatus*, Schrank, *R. fœniculaceus*, Gilib., *R. pectinatus*, Dubois, *R. paucistamineus*, Tausch, and to the forms *hederæfolius*, *homoiophyllus*, *floribundus*, *circinatus*, *trichophyllus* and *fluitans* of this enumeration.

The floating leaves in the *hederaceus* and *heterophyllus* groups, when developed under favourable circumstances, have in many cases curved outlines of much beauty and regularity; it is thus seen that such curves obviously obey definite and exact laws, and inquiry is naturally suggested into their nature.

The following results are taken from a paper read by me on March 13th, 1871, before the Cambridge Philosophical Society:—Consider the curved margin of an undivided portion of a leaf which floats in a stream exposed to the resistance of the current; suppose that the power of growth is exerted equally at all points of the margin, and tends to push the margin normally outwards, so as to oppose rather than co-operate with the current, and is just balanced at the instant considered by the other mechanical forces which act on the margin; and further suppose that the margin remains as a flexible curve with tangential tension, but not submitted to either normal strains or wrenching couples. It then follows, from merely mechanical reasons, that the tangential tension is the same at all points, and that the form of the portion of the margin at the instant under consideration is determined by one of the following intrinsic equations:—

$$\tan\left(\frac{s}{l}\cos\alpha\right) = \cos\alpha\tan\phi, \text{ or } e^{\frac{2s.\cot\beta}{l}} = \frac{\sin(\beta+\phi)}{\sin(\beta\sim\phi)}$$

according as the vigour of growth is more or less than sufficient to overpower the direct resistance of the current.

In these equations s represents the length of the arc of the margin measured from that point of it where its tangent is in the direction of the current to the point where the tangent makes the angle ϕ with that direction; and l and α or β are quantities dependent only upon the proportional values of the tangential tension, the power of growth and the direct resistance of the current.

It readily follows from these equations that the curvature of the margins, at those points where the tangent makes a small angle with the direction of the current, is greater than at those points where the tangent makes a larger angle. After the leaf-margin ceases to be flexible, as, for instance, after the completion of its growth, the investigation can be extended to calculate the tangential tensions, the normal strains and the wrenching couples, to which it is then submitted at different points of the margin, and tolerably simple expressions are found for them. The first equation when traced furnishes a series of separate ovals (but not ellipses), the longest diameters of which all lie on one straight line, perpendicular to the direction of the current; the second equation furnishes a pair of catenary-like curves, with their convexities opposed to each other, which become actual catenaries when the power of growth would just balance the direct resistance of the current. Parts only of these curves are applicable to the hypothesis; and in no case are those parts applicable which correspond to points where ϕ lies between 180° and 360°.

When the leaves are divided, as is frequently the case, each lobe must be treated to a separate calculation; and when the margins are exposed to violent strains or abnormal mechanical conditions, growth is probably checked and the leaves tend to retain their form by the support of their interior, but new lobes may be produced at those points where the tendency to break, as determined by the method above indicated, is a maximum.

MONOGRAPH OF THE GENUS XIPHION.

By J. G. Baker, F.L.S.

(*Concluded from p.* 43.)

10. *X. alatum*, Baker; bulbo ovoideo magno membranaceo-tunicato, caule nullo, foliis 4–6 lorato-lanceolatis infimis demum pedalibus, acutis falcatis margine ciliatis, spathæ valvis lanceolatis ventricosis 3–4-uncialibus, ovario sessili, tubo 3–6-unciali sæpe exserto, limbi cæruleo-violacei segmentis exterioribus oblongo-spathulatis 2½–3-uncialibus, interioribus triplo brevioribus linearibus patulis vel deflexis, stigmatibus cum cristis segmentis exterioribus subæquilongis.—*Iris alata*, Poiret, Voy. Barb. vol. ii. p. 86 (1786); Lam. Encyc. vol. iii. p. 302; Bot. Reg. t. 1876, et aliorum. *Thelysia alata*, Parl. Fl. Ital. vol. iii. p. 317. *Coresanthe alata*, Klatt, Linnæa, vol. xxiv. p. 575 (ex parte). *Iris scorpioides*, Desf. Atl. vol. i. p. 40. t. 6 (1800); Red. Lil. t. 211, et aliorum. *Juno scorpioides*, Tratt. Answ. vol. i. p. 135. *Costia scorpioides*, Willk. Bot. Zeit. 1860, p. 131; Willk. et Lange, Prodr. Hisp. vol. i. p. 144. *Iris transtagnana*, Brot. Fl. Lus. vol. i. p. 52. *I. trialata*, Brot. Phyt. vol. ii. p. 44. t. 95. *I. microptera*, Vahl, Enum. vol. ii. p. 142. *Thelysia grandiflora*, Salisb. Hort. Trans. vol. i. p. 303.

Bulb ovoid, 1½–2 inches thick, coated with dark membranous tunics, the rootlets thickened. Stem none. Leaves 3–4 on each side, distichous, clasping and concealing the lower part of the spathe and tube, lorate-lanceolate, falcate, 12–18 lines broad downwards, narrowed gradually from the middle to an acute point, bright green, the edge minutely ciliated. Flowers solitary or rarely two from a bulb. Valves of the spathe lanceolate, 3–4 inches long, very ventricose; ovary sessile at the top of the bulb as in Crocus. Tube slender, 3–6 inches long, usually exserted at the flowering time. Limb bright blue-purple; the outer divisions 2½–3 inches long, oblong-spathulate, with a bright yellow keel inside, an inch or more broad, beardless; inner divisions under an inch long, linear, spreading between the edges of the outer one. Stigmas with crest nearly as long as the outer segments, 6–8 lines broad at the apex of the lamina.

Hab. Portugal, Brotero. Spain, Webb! Willkomm! etc. Sardinia, Müller! Bonjean! E. Thomas! Sicily, Ball! Algeria, Balansa, 39! Schimper! Bové! etc.

A very showy species, flowering in its native countries from December to February.

11. *X. palæstinum*, Baker; bulbo ovoideo membranaceo-tunicato, caule nullo, foliis 4–6 lorato-lanceolatis arcte falcatis margine ciliatis infimis semipedalibus, spathæ valvis membranaceis 3–4-uncialibus, ovario sessili, tubo incluso, limbi lutescentis segmentis exterioribus oblongo-spathulatis 1½–2-uncialibus, interioribus linearibus triplo brevioribus patulis vel deflexis, stigmatibus cum cristis segmentis exterioribus subæquilongis.

Bulb ovoid, 12–18 lines thick, with thickened rootlets and loose dark brown membranous tunics. Leaves about half-a-dozen, lorate-lanceolate, sharply falcate, 9–12 lines broad at the base, 4–6 inches long, glaucescent, narrowed gradually from the middle to an acute point, the edge minutely denticulate. Spathe 3–4 inches long, with membranous linear valves reaching up to the base of the limb at the flowering time. Ovary sessile; tube

2–3 inches long; limb pale yellow, the outer divisions oblong spathulate, 1½–2 inches long, 6–9 lines broad; inner divisions linear, 6–8 lines long, spreading between the edges of the outer ones. Stigmas with the crest very nearly as long as the outer segments, half an inch broad at the apex of the limb.

Hab. Palestine; rocks of the valley of Barghoutie, near Saida, Blanche, Herb. Syr. n. 42! Gaillardot! Hebron! Lowne! Plain of Sharon, flowering in January, Miss Osborne.

Closely allied to the preceding, but much smaller in size, with a shorter tube included in the spathe and a pale yellow limb.

12. *X. persicum*, Miller; bulbo ovoideo membranaceo-tunicato, caule nullo, foliis linearibus post anthesin maturatis demum subpedalibus, spathæ valvis haud ventricosis 2–3-uncialibus, ovario sessili, tubo exserto, limbi segmentis exterioribus 1½–2-uncialibus oblongo-oblanceolatis albidis extus violaceo tinctis intus flavo carinatis, interioribus linearibus triplo brevioribus patulis vel deflexis, stigmatibus cum cristis segmentis exterioribus paulo brevioribus.—*X. persicum*, Miller, Gard. Dict. edit. 6. *Iris persica*, Linn. Sp. Plant. edit. 2. p. 59; Bot. Mag. t. i.; Rédouté, Lil. t. 189. *Costia persica*, Willk. Bot. Zeit. 1860, p. 132. *Coresanthe persica*, Alefeld, Bot. Zeit. 1863, p. 296; Klatt, Linnæa, vol. xxiv. p. 574.

Bulb ovoid, an inch thick, with brown membranous coats, the rootlets rather fleshy. Stem none, the leaves all radical, not developed until after the plant has flowered, glaucous, linear, finally a foot long, 5–6 lines broad in the lower part, deeply channelled in front and rounded on the back, the edge minutely ciliated. Spathe 2–3 inches long, the valves linear, 2–3 lines broad, not ventricose. Ovary from the base of the spathe. Tube 2–4 inches long, generally exserted at the flowering time. Outer segments of the limb 1½, or in cultivated specimens 2 inches deep, 6–8 lines broad, oblanceolate-oblong, nearly white, marked with a bright violet blotch below the reflexed tip and a bright yellow beardless keel down the throat. Inner divisions 6–8 lines long, linear, spreading between the edges of the outer ones, often toothed. Stigmas as broad and, including the crest, nearly as long as the outer segments.

Hab. Cappadocia, Montbret! Aucher-Eloy, 2131! Fort William, banks of the Euphrates, Chesney, 3!

A garden favourite of very old date, but now, we fear, lost from the English collections. It is very fragrant, and flowers in England in February or March.

13. *X. caucasicum*, Baker; bulbo ovoideo membranaceo-tunicato, caule 1–4-unciali 1–3-floro, foliis caulinis 4–6 distichis confertis lineari-lanceolatis deorsum 6–8 lin. latis arcte falcatis margine serrulatis, spathæ valvis 1½–2-uncialibus valde ventricosis ad basin limbi attingentibus, pedunculo subnullo, perianthii tubo 1–1½-unciali, limbo lutescente, segmentis exterioribus oblanceolatis sesquiuncialibus, interioribus linearibus 2–3-plo brevioribus patulis vel deflexis, stigmatibus cum cristis segmentis exterioribus paulo brevioribus.—*Iris caucasica*, Hoffm. Comm. Soc. Phys. Med. Mosc. vol. i. p. 40; M. Bieb. Fl. Taur.-Cauc., vol. i. p. 33, vol. iii. p. 45; Sweet, Fl. Gard. t. 255; Led. Fl. Ross, vol. iv. p. 100, et aliorum. *Thelysia caucasica*, Parl. Fl. Ital. vol. iii. p. 317. *Costia caucasica*, Willk. Bot. Zeit. 1860, p. 132. *Neubeckia caucasica*, Alefeld, Bot. Zeit. 1863. p. 297. *Coresanthe caucasica*, Klatt, Linnæa, vol. xxiv. p. 575.

Bulb ovoid, an inch thick, with tight dark brown membranous coats, the rootlets thickened. Stem erect, 1–4 inches high, 1–3-flowered, with 2–3 leaves placed closely distichously on each side. Leaves sharply falcate, linear-lanceolate, 2–4 inches long, 6–8 lines broad at the base, glaucescent on the outside, narrowed gradually from the middle to an acute point, the edge minutely ciliato-denticulate. Valves of the spathe lanceolate, 1½–2 inches long, very ventricose, reaching up to the base of the limb at the flowering time. Ovary sessile in the spathe. Tube 12–18 lines long. Limb yellow, the outer divisions oblanceolate, 1½ inch long, 5–6 lines broad; the inner linear 6–8 lines long, spreading or deflexed between the edges of the outer ones. Stigmas with their crest nearly as long and broad as the outer segments.

HAB. Georgia, Steven! Szovits! Hohenacker! Iberia, Fischer! Wilhelms! Gamba! Armenia, Aucher Eloy, 5345! Bourgeau, 247! Huet du Pavillon! etc. Kurdistan, Olgum! Capt. Garden! Afghanistan, Griffith (E. Ind. Co. distr. no. 5903). Beloochistan and Scinde, Stocks!

Only found amongst the mountains at a considerable elevation, flowering in May and June.

14. X. *Aucheri*, Baker; bulbo ovoideo membranaceo-tunicato, caule erecto 6–9-unciali 1–2-floro, foliis 4–6 lorato-lanceolatis deorsum 12–15 lin. latis falcatis margine integris infimis caule subæquilongis, spathæ valvis 2–3-uncialibus ad basin limbi attingentibus, pedunculo subnullo, tubo biunciali, perianthii limbo flavescente, segmentis exterioribus sesquiuncialibus oblongo-oblanceolatis, interioribus anguste linearibus, triplo brevioribus patulis vel deflexis, stigmatibus cum cristis segmentis exterioribus subæquilongis.

Bulb ovoid, 15–18 lines thick, with dark brown membranous coats. Stem erect, 6–9 inches high, 1–2-flowered. Leaves 4–6, like those of *alatum* in breadth and texture, but proceeding from the stem, 12–15 lines broad at the base, distichous, falcate, narrowed gradually from the middle to an acute point, the edge not at all denticulate, the lowest 6–9 inches long. Valves of the spathe lanceolate, scariose, reaching the base of the limb at the flowering time. Ovary sessile. Tube about 2 inches long. Limb yellow; the outer divisions about 18 lines long in the wild specimens, oblanceolate-oblong, 5–6 lines broad; inner divisions linear, about half an inch long, spreading between the outer ones as in the other species. Stigmas with the crest as long as the outer divisions, 4–5 lines broad at the base of the limb.

HAB. Syria, Aucher-Eloy, 2137!

I have seen only three dried specimens of this; but it seems a very well-marked plant, combining the habit and flower of *caucasicum* with the leaves of *alatum*.

SHORT NOTES AND QUERIES.

VEGETABLE BROOM-MATERIALS.—As supplementary to Prof. Dyer's notes (p. 51) the stalks of the common garden Cress (*Lepidium sativum*) may be added. In Russia they are used for this purpose, and a small broom brought home by Dr. Hooker on his return from Russia is now in the Museum at Kew. The stalks are stiff and strong; and judging from the above specimen, they appear quite suitable for broom making. The stems of *Tamarix gallica* have also been used for a similar purpose.

Pliny mentions their employment for besoms among the Romans, and Browne in his 'Britannia's Pastorals' says,—

> "Amongst the rest the Tamarisk there stood,
> For housewives' besoms onely knowne most good."

J. R. JACKSON.

PLANTS OF CO. CORK.—*Drosera anglica.*—I found this sparingly in a new station, Bluefort Bog, Newmarket, in the north-west of the county, in the summer of 1870. The 'Cybele' states it as hitherto only recorded from the west; indeed, apparently only from a point so far west as Berehaven. On the same bog very sparingly grew *Carex limosa*, not yet recorded from this county. *Ranunculus heterophyllus*, Bab., for which only a few stations in the extreme north of Ireland are given in the Cybele Hib., is not uncommon in this neighbourhood. I gathered it abundantly last summer. *Trifolium scabrum* is stated to be very rare, and to occur only in one or two of our midland counties. (See Cyb. Hib.) Two or three years since I found it growing abundantly on sand-hills near Youghal, in this county.—T. ALLIN.

CHLOROPHYLL PRODUCED WITHOUT INFLUENCE OF LIGHT (p. 15).—The production of chlorophyll in plant-tissues removed from the influence of light has not escaped the attention of physiologists. Sachs has discussed the matter (see Micheli's translation of his 'Physiologie Végétale'); although he considers that the virescence of the embryos of many plants is not really a case in point, since "the light penetrates through the walls of the carpel and the testa of the seed with sufficient energy to produce this result." He has, however, found that the embryos of *Pinus Pinea*, *P. canadensis*, *P. Strobus*, *Thuja orientalis* become green even when every precaution is taken to keep them in obscurity, and that this is also the case with the fronds of *Adiantum Capillus-Veneris*, *Polypodium vulgare*, *Aspidium spinulosum*, *Scolopendrium officinale*, *Pteris chrysocarpa*. He thinks that in cases like these there may be a substance capable of acting on the protoplasm with the same effect as light. He finds reason for thinking this likely, from the production of a green colour when etiolated chlorophyll is heated with fuming sulphuric acid.—W. T. THISELTON DYER.

ECONOMIC APPLICATIONS OF CYPERUS LONGUS, *L.*—In Ansted's 'Channel Islands,' p. 517, it is stated that the material named *Han* "is derived from the fibre of the *Cyperus longus*, manufactured like hemp. It is used instead of rope for many purposes, and is preferred to hemp, inasmuch as it does not readily harden, or become coated with slimy weed, when exposed to the action of salt water. Mats, footstools, saddles, horse-collars, shackles for cattle, etc., are made from it, as well as boat-rope, and rope for various fishing purposes." On page 180, the manufacture is spoken of as confined to Guernsey; and when in the island last year I made inquiries about it, but without much success. After some search I heard that native-made saddles and mats were occasionally brought into S. Peter Port from the distant parts of the island. I secured one of the saddles, which is a packsaddle used for bringing up the *vraic* or wrack from the shore. It is now in the Economic Museum of

Kew. The main part of the saddle is simply made of the plaited stems of *Scirpus Tabernæmontani*. The inside is partly lined with *Cyperus longus*, but in its natural state merely dried; nor could I ascertain that any of the fibre as described by Prof. Ansted was manufactured. The ordinary rope used in the island is made of coir or jute. I noticed that bands of the *Cyperus* were used in tying up sheaves of barley, instead of, as customary in England, a band of the same plant as the sheaf.—W. T. THISELTON DYER.

FERTILIZATION.—We very much want a term to express the falling of the pollen on the stigma (the German *Bestäubung*). In ordinary text-books no distinction is drawn between this and fertilization; but Darwin and Hildebrand have clearly shown that frequently when the stigma is be-pollened from its own stamens (*Selbst Bestäubung*), the pollen is still carried to other flowers by insects, so that cross-fertilization takes place. Can any of your readers suggest a better term than "pollenization"?—A. W. BENNETT.

PERIANTH (p. 54).—I am glad Mr. Grindon has called attention to this term; it has always seemed to me a wholly useless (and therefore undesirable) one, and one that ought to be abolished. Why should we not speak of the calyx and corolla of a tulip or iris as much as of a water-lily? We are told that there is no organic distinction between calyx and corolla, and that they can only be distinguished by their position. If so *Rumex* and *Polygonum* are distinctly di-chlamydeous, possessed of a true calyx and corolla.—A. W. BENNETT.

JUNCUS HOSTII, *Tausch.*—In Gay's herbarium there is a specimen of a rush sent by Dr. Greville from Braeriach, which is referred by Gay to the *Juncus Hostii* of Tausch, and which is evidently substantially identical with the plants given under that name in Reichb. Exsicc. n. 1614, F. Schultz, Herb. Norm. n. 52, and F. Schultz, Fl. Gall. et Germ. Exsicc. n. 1333. Along with it Gay writes, "Ab simillimo *J. trifido* differt culmis 1–2-foliatis non aphyliis." A full description will be found in Koch's 'Synopsis,' where it is placed as a distinct species; but although I have not yet looked specially to see, I believe that it will be found that Scotch specimens have stem-leaves developed not unfrequently.—J. G. BAKER.

CHLOREA VULPINA, *L.*, AND EVERNIA DIVARICATA, *L.*, are recorded as British lichens, but without special locality, in some early volume of the 'Phytologist.' Can any lichenist permit me the sight of British specimens? or give further information as to localities?—W. A. LEIGHTON.

VACCINIUM VITIS-IDÆA AND EMPETRUM NIGRUM.—I was much interested in Mr. Bagnall's notice (p. 51) of the occurrence of these plants on Cannock Chase and Sutton Coldfield, as it recalled to me that they occur with *V. Myrtillus* and *V. Oxycoccus* and *Listera cordata* on our only Shropshire subalpine locality, Stiperstones Mountain (1500–1600 feet). *Empetrum nigrum*, *V. Myrtillus* and *V. Oxycoccus* occur plentifully on other Shropshire hills and bogs, but never, so far as I am aware, in conjunction with *V. Vitis-Idæa* and *Listera cordata*. What is the height above the level of sea of Cannock Chase and Sutton Coldfield, and does the vegetation generally partake of a subalpine character?—W. A. LEIGHTON.

THE TRUE TETRASPORES OF SEIROSPORA GRIFFITHSIANA.—In 1862 I received from Miss Dyke Poore *S. Griffithsiana*, from Jersey, with what appeared to me tetrasporic fruit. I sent the plant to the late Professor Walker Arnott, of Glasgow, who confirmed my opinion. The tetraspores occurred in pairs or singly on short pedicels, very different to the necklace-like hardened bodies termed 'seirospores,' produced usually on this plant at the extremities of the ramuli. According to Agardh, these bodies likewise occur in the genus *Callithamnion.* I believe the *true* tetraspores of *Seirospora* have been observed by Agardh, but I have seen no notice of their occurrence on British specimens, nor have I ever seen them on any but these Jersey plants. If seirospores are also produced in the genus *Callithamnion*, there seems no reason why *Seirospora* should not be replaced in that genus from which it was removed on account of these bead-like seirospores, which were supposed to be restricted to this species alone. I would recommend algologists during the approaching season to carefully examine all specimens of *Seirospora Griffithsiana* in search of the tetraspores.—I. GIFFORD.

PLANTS OF THE SITE OF THE EXHIBITION OF 1862.—Since the building in which the International Exhibition of 1862 was held was pulled down, the site has remained weed-covered and unoccupied. From time to time I have visited the ground, and have almost on every occasion found some new and interesting plant which I had not seen there before. The plants at first found were mostly annuals, which grow rapidly, and cannot tolerate consolidated soil, and, moreover, only precariously ripen their seed. Afterwards perennials, represented at first possibly by only a few unnoticed individuals, increased and took the place of the departed annuals. The year 1870 was the last opportunity of collecting these, as they will soon be extinguished by the new Natural History Museum. Of a list published in the fourth volume of the 'Journal of Botany,' p. 151, only *Artemisia scoparia*, W. and K., *Carduus arvensis*, Curt. var. *setosus* and *Œnothera biennis*, L., occurred in 1870,—all of them, however, abundantly. *Physalis Alkekengi*, L., recorded in last list, was an error for the not dissimilar *Nicandra physaloides*, Gærtn. (See Fl. Middx. p. 195.) The International Horticultural Exhibition in 1866 probably introduced some additional species. Up to 1869 these are noted in the 'Middlesex Flora.' In 1870 I met with the following plants, which are not given in the Flora for this locality. *Saponaria officinalis*, L., *Epilobium angustifolium*, var. *brachycarpum*, Leight., *Rumex alpinus*, L., were, like *Œnothera biennis*, L., doubtless the remains of old garden cultivation reasserting themselves. This may also have been the case with *Kitaibelia vitifolia*, W., a plant peculiar to Hungary, which may, nevertheless, have been introduced along with *Artemisia scoparia*, W. and K.; also a plant of south-eastern Europe. If the *Artemisia* could establish any footing beyond the Exhibition ground, which is likely enough to happen if earth has to be removed for the foundations of the new Museum, it would certainly become a permanent addition to our London flora. The remaining plants were *Lepidium Draba*, L., *Reseda suffruticulosa*, L., *Echium vulgare*, L., *Car-*

duus arvensis, var. *vestitus*, Reichb. (*Cirsium vestitum*, Wimm.), which is the variety *setosus* with the leaves clothed underneath with dense white hairs, and *Centaurea Jacea*, L. This last was very abundant, and I noticed several forms which seem to be those figured and described by Reichenbach as *lacera*, *cuculligera*, and *crispo-fimbriata*. According to Syme (Eng. Bot., v. 31), the plant found at Acton was *C. amara*, De Cand., which is quite different. This I have not noticed about London. To these may also be added *Sida spiciflora*, De Cand., noticed in 1866, and *Malva verticillata* (in Gard. Chron., October 9, 1869, p. 1067).—W. T. Thiselton Dyer.

Botany.—When did the word "Botany" come to have its present signification?—W. T. Thiselton Dyer.

Reports.

REVIEW OF THE CONTRIBUTIONS TO FOSSIL BOTANY PUBLISHED IN BRITAIN IN 1870.

By William Carruthers, F.L.S.

Carruthers, W. On Fossil Cycadean Stems from the Secondary Rocks of Britain. Trans. Linn. Soc. vol. xxvi. pp. 675–708, pl. liv–lxiii.

After investigating the nature of the Palæozoic remains referred to *Cycadeæ*, the author describes twenty-five species belonging to eight genera. Four of the genera are placed in one or other of the tribes of the existing Cycads, while two new tribes are established for the remaining genera.

——— On the Petrified Forest near Cairo. Geol. Mag. vol. vii. pp. 306–310, pl. xiv.

The so-called forest is described, and the different specimens of silicified woods found in it are referred to two species of the genus *Nicolia*.

——— On the Structure of a Fern-stem from the Lower Eocene of Herne Bay, and on its Allies, Recent and Fossil. Quart. Journ. Geol. Soc. vol. xxvi. pp. 349–353.

The stem (*Osmundites Dowkeri*) is minutely described, and compared with that of *Osmunda regalis*, L. A new arrangement of some described Fern-stems from Palæozoic and Mesozoic rocks is proposed by the author.

Dawson, J. W. On the Pre-carboniferous Floras of North-eastern America, with especial reference to that of the Erian (Devonian) Period. Abstract. 'Proceedings of Royal Society,' May 5, 1870.

The Erian Flora is revised, and twenty-three new species added. Large trunks of *Prototaxites* are described, and also two species of *Psilophyton*, with details of their form, structure, and fructification. The occurrence of *Lepidophloios* and *Calamodendron*, noticed for the first time in the Middle Devonian; specimens of *Cyclostigma* and *Cardiocarpum*, and a new genus, *Ormoxylon*, are described.

——— On the Graphite of the Laurentian Rocks of Canada. Quart. Journ. Geol. Soc. vol. xxvi. pp. 112–117.

The author estimates that the quantity of carbon in the Laurentian is equal to that in similar areas of the Carboniferous systems. This carbon has been obtained from the deoxidation of carbonic acid by plants, and consequently indicates the existence of plants side by side with the *Eozoon*.

M'NAB, W. R. On the Structure of a Lignite from the Old Red Sandstone. Trans. Bot. Soc. Edin. vol. x. p. 312.

The author proposes to name the wood which he describes *Palæopitys Millerii*. It was found by Hugh Miller at Cromarty.

VON MUELLER, F., and R. BROUGH SMYTH. Observations on some Vegetable Fossils from Victoria. Geol. Mag. vol. vii. p. 390.

The specimens were fruits from surface deposits, and were obtained from one of the deep leads at Haddon. One is a coniferous fruit allied to *Solenostrobus*, of Bowerbank, to which the name of *Spondylostrobus Smythii* is given. The others are not named, but suggestions are given as to their affinities, and these indicate, according to Von Müller, a flora analogous to that of the existing forest-belt of Eastern Australia.

WILLIAMSON, W. C. Contributions towards the History of *Zamia gigas*, Lindl. and Hutt. Trans. Linn. Soc. vol. xxvi. pp. 663–674, pl. 52, 53.

The author gives an account of the different structures which he believes to belong to this plant, describing in detail the stem, leaves, and male and female flowers.

Synopsis of the Genera and Species described in the preceding Papers.

FILICES.

Chelepteris, Quart. Journ. Geol. Soc. vol. xxvi. p. 352.

Osmundites Dowkeri, Carr. Quart. Journ. Geol. Soc. vol. xxvi. p. 349. *Lower Eocene*. Herne Bay.

CYCADEÆ.

Bennettites Gibsonianus, Carr. Trans. Linn. Soc. vol. xxvi. p. 681, pl. lviii–lx. *Lower Greensand*. Luccombe Chine, Isle of Wight.

B. maximus, Carr. l. c. *Wealden*. Isle of Wight.

B. Peachianus, Carr. l. c.; pl. lxii. *Middle Oolite*. Helmsdale, Sutherlandshire.

B. Portlandicus, Carr. l. c.; pl. lxi. *Lower Purbeck*. Isle of Portland, Dorsetshire.

B. Saxbyanus, Carr. l. c.; pl. lvii. *Wealden*. Isle of Wight.

Bucklandia anomala, Presl, Trans. Linn. Soc. vol. xxvi. p. 679; pl. liv. fig. 1–3. *Wealden*. Cuckfield, Sussex.

B. Mantellii, Carr. l. c.; pl. liv. fig. 4. *Wealden*. Cuckfield, Sussex.

B. Milleriana, Carr. l. c.; pl. lv. fig. 1. *Coral Rag*. Brora, Sutherlandshire.

B. squamosa, Brongn. l. c. *Stonesfield Slate*. Stonesfield.

Crossozamia Buvignieri, Pomel, l. c. p. 680. *Jurassic*. St. Michel, France.

C. Moreaui, Pomel, l. c. *Jurassic*. St. Michel, France.

Mantellia inclusa, Carr. l. c. p. 681; pl. lxiii. fig. 2 and 3. *Lower Greensand*. Potton, Cambridgeshire.

M. intermedia, Carr. l. c.; pl. lxiii. fig. 4 and 5. *Lower Purbeck*. Isle of Portland, Dorsetshire.

M. microphylla, Brongn. l. c.; pl. lxiii. fig. 6. *Lower Purleck*. Isle of Portland, Dorsetshire.

M. nidiformis, Brongn. l. c.; pl. lxiii. fig. 1. *Lower Purbeck.* Isle of Portland, Dorsetshire.

Raumeria Reichenbachiana, Göpp. l. c. p. 682. Formation unknown. Wieliczka, Gallicia.

R. Schulziana, Göpp. l. c. Formation unknown. Gleiwitz, Silesia.

Williamsonia gigas, Carr. l. c. p. 680; pl. lii. and liii. *Inferior Oolite.* Scarborough, Yorkshire.

W. hastula, Carr. l. c. *Inferior Oolite.* Saltwick, Yorkshire.

W. Pecten, Carr. l. c. *Inferior Oolite.* Gristhorpe, Yorkshire.

Yatesia crassa, Carr. l. c. p. 680; pl. lv. fig. 7. *Coral Rag.* Brora, Sutherlandshire.

Y. gracilis, Carr. l. c.; pl. lv. fig. 2. *Lias.* Lyme Regis, Dorsetshire.

Y. Joassiana, Carr. l. c.; pl. lv. fig. 8 and 9. *Coral Rag.* Brora, Sutherlandshire.

Y. Morrisii, Carr. l. c.; pl. lv. fig. 3–6. *Lower Greensand.* Potton, Cambridgeshire.

Zamia gigas, Lindl. and Hutt. Trans. Linn. Soc. vol. xxvi. p. 663; pl. lii. and liii. *Inferior Oolite.* Yorkshire.

CONIFERÆ.

Ormoxylon, Dawson, Proc. Roy. Soc. May, 1870.

Palæopitys Millerii, M‘Nab, Trans. Bot. Soc. Edin. vol. x. p. 312.

Spondylostrobus Smythii, Von Muell. Geol. Mag. vol. vii. p. 390. *Post Tertiary.* Haddon, near Smythesdale, Victoria.

ANGIOSPERMOUS DICOTYLEDONS.

Nicolia Ægyptiaca, Endl. Geol. Mag. vol. vii. p. 309, pl. xiv. fig. 1 and 2. *Tertiary.* Desert of Suez, east from Cairo.

N. Owenii, Carr. Geol. Mag. vol. vii. p. 310, pl. xiv. fig. 3 and 4. *Tertiary.* Desert of Suez, east from Cairo.

NEW SPECIES OF PHANEROGAMOUS PLANTS PUBLISHED IN GREAT BRITAIN DURING THE YEAR 1870.

(*Concluded from p.* 85.)

O. PRASINUM, *Lind.*, *Reichb. f.*; pedunculo fractiflexo, ramulis fractiflexis, bracteis minutissimis, ovariis pedicellatis elongatis, sepalo dorsali cuneato oblongo apiculato, sepalis lateralibus deflexis extus viridi carinatis; petalis subæqualibus brevioribus, labello columnæ appresso oblongo obtuso utrinque limbo lobato, callis angulatis geminis in basi, columna brevi aptera, angulis baccarum prominulis superne obtusangulis. —HAB. Discovered in Ecuador by Mr. Wallis; flowered with M. Linden. —*Gard. Chron.* 1870, p. 987.

O. WALLISII, *Lind. Reichb. f.*; paniculatum (?); ramo fractiflexo paucifloro grandifloro, sepalis petalisque ligulatis acuminatis, labelli ungue ligulato, utrinque erecto, callo parvo interposito basin versus, lamina pandurata antice retusa cum apiculo, callis ternis falcatis utrinque in basi antepositis callis ascendentibus furcatis, utrinque pilis arachnoideam lanam efficientibus bilineatis in disco, columna gracili basi utrinque angulata, alis triangulis serratis, infra juxta foveam angulatis.—HAB. Discovered in New Granada by Director Linden's invaluable lynx-eyed traveller M. Gustav Wallis, to whom it is dedicated.—*Gard. Chron.* 1870, p. 104.

Oncidium calanthum, *Reich. f.* (*Orchideæ*) (affine *Oncidio formosissimo*); panicula volubili maxima apice heterantha, sepalis unguiculatis oblongis obtuse acutis, petalis oblongis obtusis hastato-unguiculatis, labelli auriculis cuneato ovatis retusiusculis isthmo brevissimo latissimo obcuneato, portione antica reniformi biloba maxima, carinis papulosis quinis in basi, papulis ternis extus utrinque, carinis rostriformibus acutis geminis ante carinas, columnæ alis triangulis hinc lobulatis, rostello ornithorrhyncho, tabula rhombea basi constricta.—Hab. Messrs. Backhouse imported this from Ecuador or Peru.—*Gard. Chron.* 1870, p. 39.

O. **cryptocopis**, *Reichb. f.* (*Cyrtochila auriculata* labello apice dilatato); sepalo summo ovato transverse undulato serrulato hastato supra unguem bene auriculatum, sepalis lateralibus deflexis longe unguiculatis in laminas oblongas acutas paulo undulatas cuneatis, auriculis in basi nullis; petalis unguibus latis brevibus oblongis acutis, undulatis serrulatis, labello trifido laciniis lateralibus triangulis postice serrulatis antice abruptis, lacinia antica unguiculata antice dilatata semiovata, biloba crispula, tumose baseos incrassato medio carinato, utrinque papuloso, papula altera antice utrinque apposita, striis sulcisque utrinque postice, columna curva, alis ligulatis antice retusis carnosis juxta foveæ basin laminis lanceis acutis geminis sub fovea.—Patria? Ex hort. W. Bull. —*Gard. Chron.* 1870, p. 827.

O. **lepidum**, *Lind.*, *Reichb. f.* (affine *Oncidio Boothianio*, Reichb. f.); panicula ampla pluriflora, sepalis unguiculatis, petalis sublatioribus, labello basi utrinque obtusangulo, isthmo brevi antice reniformi, quadrilobo, callis acutis sex in ima basi, columnæ alis utrinque acutis antice retusis; flores parvi, illis *Oncidii Boothianii* æquimagni; sepala et petala albido-flava, maculis paucis brunneis; labellum flavum, isthmo purpureo et macula purpurea utrinque in basi; maculæ purpureæ duæ sub fovea. —Hab. M. Linden obtained it from Ecuador, through Mr. Wallis.—*Gard. Chron.* 1870, p. 1053.

O. **rusticum**, *Lind.*, *Reichb. f.*; (affine *Oncidio cimicifero*, Reichb. f.); panicula ampla, sepalis petalisque ovatis obtusis basi paulo cuneatis, labello utrinque obtusangulo antrorsum angustato retuso, callo amplo utrinque quadrilobo antice retuso, medio unipapuloso in basi, columnæ alis subnullis lobulos minutos juxta foveam sistentibus, tabula retusa, in ima basi constricta.—Hab. M. Linden obtained it from Ecuador, through Mr. Wallis.—*Gard. Chron.* 1870, p. 1053.

O. **Semele**, *Lind.*, *Reichb. f.* (affine *Oncidio formosissimo*); panicula ampla, diffusa; sepalis ligulatis, dorso medio carinatis; petalis supra unguem hastato-oblongis obtuse acutis, labello statim in auriculas latas oblongo-ligulatas obtusas dilatato, isthmo brevissimo obcuneato subnullo, lacinia antica reniformi magna subemarginata, callo baseos multipapuloso, carinatis rhombeis geminis papulosis antepositis, columnæ alis triangulis lobulatis, tabula lata rhombea.—Hab. It was discovered in Ecuador by Director Linden's excellent and successful collector, Mr. Wallis.—*Gard. Chron.* 1870, p. 39.

O. **vernixium**, *Lind.*, *Reichb. f.* (Pentapetala macropetala); sepalis unguiculatis oblongis acutis crispis; petalis unguiculatis hastatis oblongis apice acuto incurvo crispis; labelli auriculis ligulatis retusis retrorsis, lamina late ligulata apice reniformi, toto disco valde vernixio, callo retrorsum et antrorsum bicruri in basi, columnæ alis angustissimis angulatis minutis utrinque juxta foveam, tabula vix porrecta.—Hab. A highly curious Oncid, quite unlike anything known up to this time. Discovered by Mr. Wallis near Paccha.—*Gard. Chron.* 1870, p. 1053.

ORNITHOGALUM ACUMINATUM, *Baker* (*Liliaceæ*); foliis 10–12 bipedalibus firmis anguste ensiformibus ascendentibus viridibus sensim angustatis apice longe acuminatis, scapis 2–3 gracilibus foliis æquantibus, racemo elongato angusto 30–50-floro, pedicellis strictis erecto-patentibus floribus brevioribus, bracteis linearibus sesquipollicaribus, perigonio semipollicari, laciniis subæqualibus oblongis albis apice fornicatis dorso distincte viridi-vittatis, staminibus lanceolatis subæqualibus perigonio duplo brevioribus, stylo ovario æquante.—HAB. Algoa Bay, Hort. Saunders, from Mr. Cooper; next *O. virens*, Lindl. Bot. Reg. t. 814.—*Ref. Bot.* t. 177.

O. ANOMALUM, *Baker;* bulbo globoso dimidio superiore hypogæo viridi subsquamoso, foliis 1 vel raro 2 sesqui- vel bipedalibus perfecte teretibus flaccidis serpentinis glaucescentibus sursum sensim gracilioribus, scapo foliis subæquante, racemo elongato angusto laxo 30–40-floro, pedicellis strictis erecto-patentibus floribus subæquantibus apice articulatis, bracteis perparvis, perigonio pro genere parvo, laciniis æqualibus lanceolato-spathulatis flavis viridi-vittatis mox falcato-reflexis, staminibus perigynis æqualibus filiformibus laciniis duplo brevioribus, stylo filiformi ovario oblongo subæquante.—HAB. Cape Colony, Hort. Saunders, from Mr. Cooper.—*Ref. Bot.* t. 178.

PHOCEA ANDERSONII, *Seem. (Celastrineæ).—Vide Journ. Bot.* Vol. VIII. p. 69.

PSYCHOTRIA CYANOCOCCA, *Seem.* (*Rubiaceæ*). Not described.—HAB. Chontales, Nicaragua.—*Floral Mag.* t. 479.

PTILOTUS, *n. sp. F. Muell* (*Amarantaceæ*). No description.—*Vide Journ. Bot.* Vol. VIII. p. 322.

PYGEUM OXYCARPUM, *Hance (Rosaceæ).—Vide Journ. Bot.* Vol. VIII. p. 242.

P. PHÆOSTICTUM, *Hance.—Vide Journ. Bot.* Vol. VIII. p. 72.

RYTIDOTUS, *Hook. f. gen. nov.* (*Rubiaceæ, Timonieæ*). Flores hermaphroditi. Calycis tubus obovoideus; limbus hypocraterimorphus, persistens, lobis 4 late oblongis obtusis recurvis. Corolla hypocraterimorpha, fauce intus glaberrima; lobi 4 obovati, unguiculati, recurvi, marginibus late crispatis, valvati, lobis 2 exterioribus. Stamina 5, fauci inserta; filamentis brevissimis; antheræ lineares, infra medium insertæ, apicibus exsertis; basi 2-fidæ. Discus inconspicuus, hispidus. Ovarium 2–5-loculare; stylus elongatus, exsertus, pilosus, stigmatibus 2–5 linearibus; ovula in loculis solitaria, ab apice pendula, funiculo incrassato. Drupa 2–5-pyrena, pyrenis crassis osseis 3-gonis dorso rotundatis, loculo angusto. Semina cylindrica, funiculo incrassato apicem putaminis claudente, testa membranacea, albumine parco; embryo cylindricus, cotyledonibus minutis tenuibus.—Arbor ramosa, ramulis teretibus, ultimis et inflorescentia puberulis. Folia opposita, gracile petiolata, recurva, ovata, nervosa, et creberrime reticulatim venulosa. Stipulæ interpetiolares, squamosæ, caducæ. Flores inter minores, solitarii, axillares, pedicellati, pedicello infra flores articulato minute bracteolato. Drupa mole pisi.

R. SANDVICENSIS, *Hook. f.—Chomelia (?) sandvicensis*, A. Gray in Proc. Amer. Acad. vol. iv.; Notes on *Rubiaceæ*, p. 6.—HAB. Sandwich Islands; Oahu, solitary on the top of a hill, Hinds, 1841, and Wilkes' Expedition (fide A. Gray).—*Hook. Ic. Plant. t.* 1071.

Salvia (Eusphace) prionitis, *Hance (Labiatæ).—Vide Journ. Bot.* Vol. VIII. p. 74.

S. (Drymosphace) umbratica, *Hance.—Vide Journ. Bot.* Vol. VIII. p. 75.

Scilla (Ledebouria) camerooniana, *Baker* (*Liliaceæ, Scilleæ*); bulbo ovoideo hypogæo tunicato, foliis 4–5 erectis carnoso-herbaceis 6–8 poll. longis loratis deorsum in petiolum brevem sensim angustatis, scapo flexuoso foliis breviore, racemo modice laxo 20–30-floro 1½–2 poll. longo, pedicellis patentibus inferioribus curvatis floribus cernuis excedentibus, perigonio campanulato purpureo-viridi 1½ lin. longo, filamentis laciniis subæquantibus dimidio superiore colorato, ovario stipitato basi discoideo ampliato.—Hab. Banks of the river Cameroon, in cultivated fields, G. Mann, 728 ! v. s.—*Appendix Ref. Bot.* p. 9.

S. (Ledebouria) concinna, *Baker*; bulbo ovoideo immerso, foliis 3–4 synanthiis carnoso-herbaceis loratis erectis dorso prorsus purpureo-maculatis racemo florifero paulo superantibus, racemo dense 20–30-floro sesqui- vel bi-pollicari, pedicellis erecto-patentibus, infimis floribus subduplo excedentibus, perianthio 2½ lin. longo segmentis roseo-purpureis dorso viridi carinatis, filamentis segmentis distincte brevioribus, ovario stipitato basi discoideo ampliato.—Hab. A native of Cape Colony, gathered by Mr. Cooper; Hort. Saunders.—*Ref. Bot. t.* 235.

S. (Ledebouria) firmifolia, *Baker;* bulbo ovoideo magno, foliis 4–5 synanthiis coriaceis nervosis ascendentibus semipedalibus vel ultra anguste linearibus, scapo foliis subæquante, racemo sublaxo angusto 3–4 poll. longo 30–40-floro, pedicellis erecto-patentibus floribus subæquantibus, perigonio campanulato 1½ lin. longo saturate roseo-purpureo, filamentis laciniis subæquantibus deorsum applanatis lanceolatis, ovario sessili basi nullo modo ampliato.—Hab. Cape of Good Hope, Drége, 4492 ! eastern frontier, P. Macowan ! v. s.—*Appendix Ref. Bot.* p. 7.

S. (Ledebouria) floribunda, *Baker;* bulbo globoso solitario hypogæo, foliis erectis carnoso-herbaceis synanthiis pedalibus lorato-lanceolatis acutis pallide glauco-viridibus maculis saturatioribus notatis, scapis erectis firmis foliis triente vel dimidio brevioribus, racemo denso anguste oblongo 60–100-floro, pedicellis floribus ægre excedentibus inferioribus cernuis, perigonio 4½–5 lin. longo laciniis extrorsum viridibus introrsum purpureo tinctis, filamentis laciniis triente brevioribus dimidio superiore purpureo, ovario stipitato basi valde applanatim ampliato.—Hab. Cape Colony, Hort. Saunders, from Mr. Cooper.—*Ref. Bot. t.* 188.

S. (Ledebouria) linearifolia, *Baker;* bulbo ovoideo subhypogæo tunicato, foliis 4–5 erectis carnoso-herbaceis synanthiis subpedalibus anguste linearibus acutis pallide viridibus dorso paullulum purpureo maculatis, scapo arcuato foliis subtriplo breviore, racemo oblongo subdenso 30–40 floro, pedicellis patentibus floribus duplo longioribus, laciniis livide purpureis 3 lin. longis, filamentis laciniis triente brevioribus, dimidio superiore purpureo, ovario distincte stipitato basi discoideo ampliato.—Hab. Cape Colony, Hort. Saunders, from Mr. Cooper.—*Ref. Bot. t.* 184.

S. (Ledebouria) minima, *Baker;* bulbis gracilibus ovoideis, foliis 2–3 ascendentibus carnoso-herbaceis synanthiis linearibus 12–18 lin. longis acutis, scapis gracilibus flexuosis foliis excedentibus, racemo laxo erecto subpollicari 12–20-floro, pedicellis patentibus infimis floribus cernuis subduplo longioribus, perigonio campanulato saturate roseo-purpureo 1 lin. longo, filamentis laciniis subæquantibus supra coloratis, ovario stipitato basi discoideo ampliato.—HAB. Cape of Good Hope, Drége, 3510! Macalisberg, Burke! v. s.—*Appendix*, *Ref. Bot.* p. 6.

S. (LEDEBOURIA) MÆSTA, *Baker;* bulbo ovoideo crasso subimmerso, foliis 5–6 synanthiis carnoso-herbaceis lanceolatis purpureo-maculatis 5–6 poll. longis acuminatis basi ægre angustatis, scapis foliis brevioribus racemo angusto modice denso 1½–2 poll. longo 30–50-floro, pedicellis erecto-patentibus floribus ascendentibus æquantibus vel duplo longioribus, perigonio infundibuliformi-campanulato 1½ lin. longo omnino viridi, filamentis haud coloratis laciniis triente brevioribus, ovario stipitato basi discoideo ampliato.—HAB. Delta of the Zambesi, Dr. Kirk! v. s.—*Appendix*, *Ref. Bot.* p. 10.

S. (LEDEBOURIA) OVATIFOLIA, *Baker;* bulbis magnis ovoideo-rotundatis dimidio superiore epigæo subsquamoso, foliis 3–5 synanthiis ascendentibus carnoso-herbaceis cordato-ovatis 2–3-pollicaribus subobtusis pallide viridibus maculis saturatioribus notatis, scapis 2–3 arcuatis foliis brevioribus, racemo oblongo-conico denso 30–40-floro, pedicellis cernuis floribus ægre excedentibus, laciniis purpureo-viridibus 3 lin. longis, filamentis laciniis triente brevioribus dimidio superiore purpureo, ovario distincte stipitato, basi discoideo ampliato.—HAB. Natal, Hort. Saunders, from Mr. Cooper.—*Ref. Bot.* t. 183.

S. PALLIDIFLORA, *Baker;* foliis 5–6 lorato-lanceolatis pedalibus modice firmis erecto-falcatis glabris viridibus nervis immersis, scapo tereti erecto stricto foliis excedente, racemo elongato-conico dense 100–200-floro, pedicellis strictis patentibus floribus et bracteis solitariis linearibus multoties excedentibus, perigonio albido expanso stellato, laciniis subæqualibus oblongo-spathulatis, filamentis filiformibus, ovario subgloboso breviter pedicellato, stylo ovario æquante, loculis multiovulatis.—HAB. Cape Colony, Hort. Saunders, from Mr. Cooper. A typical *Scilla* near *natalensis*, Planch. Bot. Mag. t. 5379.—*Ref. Bot.* t. 179.

S. (LEDEBOURIA) PAUCIFOLIA, *Baker;* bulbis ovoideis gregariis dimidio superiore epigæo subsquamoso, foliis 2 vel raro 3 synanthiis carnoso-herbaceis horizontaliter patulis oblongo-lanceolatis acutis 2–3-pollicaribus pallide glauco-viridibus maculis saturatioribus notatis, scapo flexuoso foliis excedente, racemo laxo oblongo 20–30-floro, pedicellis substricte patentibus floribus cernuis duplo longioribus, laciniis 3 lin. longis albido-viridibus extrorsum basi haud vel vix purpureo tinctis, filamentis ¾ longitudinis laciniarum attingentibus dimidio superiore purpureo, basi paullulum ampliato.—HAB. Cape Colony, Hort. Saunders, from Mr. Cooper.—*Ref. Bot. t.* 181.

S. (LEDEBOURIA) PENDULA, *Baker;* foliis synanthiis carnoso-herbaceis loratis acutis pedalibus vel ultra maculis saturatioribus notatis, basi paullulum angustatis, scapo gracili foliis breviore, racemo sublaxo 30–60-floro 3–6 poll. longo, pedicellis pergracilibus pendulis 9–15 lin. longis, bracteis parvis linearibus, perigonio 4–4½ lin. longo viridi-purpureo, filamentis laciniis subæquantibus sursum saturate coloratis, ovario stipitato basi discoideo ampliato.—*Drimia pendula*, Burchell, MSS.—HAB. Cape of Good Hope, imported and cultivated by Burchell, and characterized from his dried specimens and notes.—*Appendix*, *Ref. Bot.* p. 14.

S. (LEDEBOURIA) PRASINA, *Baker;* bulbo ovoideo subimmerso, foliis 5–6 synanthiis ascendentibus carnoso-herbaceis lanceolatis 4–6 poll. longis acutis basi paullulum angustatis purpureo-maculatis, scapo foliis breviore, racemo 30–40-floro modice denso 2–3 poll. longo, pedicellis patentibus, inferioribus cernuis 2–3 lin. longis, perigonio campanulato omnino viridi vel ægre purpureo tincto 1½ lin. longo, filamentis laciniis subæquantibus supra coloratis, ovario stipitato basi discoideo ampliato.—HAB. Kaffirland, Dr. Gill! Graham's Town; flowered in Hort. Kew. March, 1862, v. s.—*Appendix*, *Ref. Bot.* p. 10.

S. (LEDEBOURIA) PRINCEPS, *Baker;* bulbo solitario globoso hypogæo, foliis 5–6 erectis carnoso-herbaceis synanthiis lorato-lanceolatis sesqui-vel bi-pedalibus acutis pallide viridibus maculis saturatioribus notatis, scapis 2–3 foliis multoties brevioribus, racemo denso oblongo-cylindrico 100–200-floro, pedicellis patentibus floribus triplo longioribus infimis cernuis, perigonio 4½–5 lin. longo laciniis extrorsum viridibus, introrsum purpureo-viridibus, filamentis laciniis triente brevioribus dimidio superiore purpureo, ovario stipitato basi valde applanatim ampliato.—HAB. Cape Colony, Hort. Saunders, from Mr. Cooper.—*Ref. Bot.* t. 189.

S. (LEDEBOURIA) SANDERSONI, *Baker;* foliis ovato-lanceolatis synanthiis carnoso-herbaceis 2–3 poll. longis acutis basi valde angustatis, scapis 1–2 foliis æquantibus, racemo rotundato denso 12–20-floro subpollicari, pedicellis 3–4 lin longis inferioribus cernuis, laciniis 1½ lin. longis, saturate roseo-purpureis, filamentis laciniis subæquantibus dimidio superiore purpureis, ovario stipitato basi discoideo ampliato.—HAB. Cape of Good Hope, Transvaal, Sanderson, v. s.!—*Appendix*, *Ref. Bot.* p. 5.

S. (LEDEBOURIA) SOCIALIS, *Baker;* bulbis ovoideis gregariis dimidio superiore epigæo, foliis 3–4 carnoso-herbaceis horizontaliter patulis synanthiis oblongo-lanceolatis acutis 2–3-pollicaribus pallide viridibus maculis saturatioribus, scapo flexuoso foliis æquante, racemo denso conico 20–30-floro, pedicellis cernuis floribus brevioribus, laciniis 3 lin. longis viridibus basi extrorsum ægre purpureo tinctis, filamentis tres-quadrantes longitudinis laciniarum attingentibus, dimidio superiore purpureo, ovario latiore quam alto basi discoideo valde ampliato.—HAB. Cape Colony, Hort. Saunders, from Mr. Cooper.—*Ref. Bot.* t. 180.

S. (LEDEBOURIA) SPATHULATA, *Baker;* bulbo magno ovoideo-rotundato tertio superiore epigæo subsquamoso, foliis 5–6 semipedalibus lanceolato-spathulatis acutis synanthiis ascendentibus pallide glauco-viridibus maculis saturatioribus notatis, scapis 2–3 arcuatis foliis brevioribus, racemo subdenso 30–40-floro pedicellis floribus subduplo longioribus inferioribus cernuis, laciniis purpureo-viridibus 4 lin. longis, filamentis laciniis vix brevioribus dimidio superiore purpureo, ovario distincte stipitato basi discoideo ampliato.—HAB. Cape Colony, Hort. Saunders, from Mr. Cooper.—*Ref. Bot.* t. 187.

S. (LEDEBOURIA) SUBGLAUCA, *Baker;* bulbo globoso tunicato hypogæo, foliis 5–6 lanceolatis acutis erectis 9–10 poll. longis infra medium paullulum angustatis carnoso-herbaceis synanthiis glauco-viridibus infra deorsum paullulum purpureo maculatis, scapo foliis subduplo breviore, racemo laxo 30–40-floro, pedicellis gracilibus floribus subduplo longioribus, inferioribus cernuis, laciniis saturate roseo-purpureis 3 lin. longis, filamentis laciniis triente brevioribus dimidio superiore purpureo, ovario stipitato basi discoideo ampliato.—HAB. Cape Colony, Hort. Saunders, from Mr. Cooper.—*Ref. Bot.* t. 186.

S. (LEDEBOURIA) ZAMBESIACA, *Baker;* foliis 2–3 synanthiis membranaceo-herbaceis lanceolato-spathulatis 2–3 poll. longis deorsum ad petiolum concavum lamina breviore cito angustatis, scapis 1–2 gracilibus 2–3 poll.

longis, racemo laxo 2–2½ poll. longo 30–40-floro, pedicellis patentibus floribus cernuis subduplo longioribus, perigonio campanulato omnino viridi 1 lin. longo, filamentis laciniis subæquantibus ægre purpureo tinctis, ovario stipitato.—Hab. Zambesi-land, a few miles below Tette, in sandy soil near the mouth of the river, discovered by Dr. Kirk on the Livingstone expedition.—*Appendix*, *Ref. Bot.* p. 8.

S. (Ledebouria) zebrina, *Baker;* bulbo crasso tunicato hypogæo, foliis 5–6 lanceolatis acutis deorsum paullulum angustatis subpedalibus synanthiis erectis carnoso-herbaceis supra glauco-viridibus immaculatis infra striis purpureis copiosis et deorsum maculis paucis notatis, scapo arcuato maculato foliis subduplo breviore, racemo oblongo denso 30–40-floro, pedicellis floribus longioribus inferioribus cernuis, laciniis viridi-purpureis 3 lin. longis, filamentis laciniis subduplo brevioribus dimidio-superiore purpureo, ovario stipitato basi discoideo ampliato.—Hab. Cape Colony, Hort. Saunders, from Mr. Cooper.—*Ref. Bot.* t. 185.

Sedum (Eusedum) Alfredi, *Hance (Crassulaceæ).—Vide Journ. Bot.* Vol. VIII. p. 7.

S. (Eusedum) chrysastrum, *Hance.—Vide Journ. Bot.* Vol. VIII. p. 6.

Senecio (Plantaginei) sneeuwbergensis, *H. Bolus* (*Compositæ*, *Senecionideæ*); candice glabro, caule simplici erecto (1–2 ped.) striato glabrato, foliis coriaceis, radicalibus elongatis anguste lineari-lanceolatis obtusiusculis basi angustatis calloso-denticulatis glabris, caulinis brevioribus, linearibus amplexicaulibus auriculis brevissime decurrentibus margine revolutis, capitulis numerosis 20–30-floris luteis in cymis corymbosis strictis v. subfastigiatis confertis, involucri calyculati cylindraceo-campanulati, squamis 12–14 lineari-oblongis apice nigrescente acutatis, floribus radii 5–7, ligula tubo æquilonga, disci involucrum superantibus; achæniis glabris.—Hab. Cape of Good Hope, Mountains near Graaf-Reinet, 4,300 ft. Fl. January. Harry Bolus, Esq.—*Hook. Ic. Plant.* t. 1067.

Spiranthes Weirii, *Rchb. fil.* (*Orchideæ*) (aff. *Spiranthidi Funckianæ*, A. Rich. et Gal.). Racemus elongatus. Rhachis brunnea glandipilis. Bracteæ lineari-setaceæ, flores æquantes seu superantes, pilosulæ. Sepalum dorsale cuneato-oblongum, acutum, brunneum, extus glandipile. Sepala lateralia cuneato-oblonga, acuta, brunnea, glandipilia, longe cum ovario connata, et in cornu conico calcaratum supra basin ovarii extensa. Petala linearia sursum dilatata, acuta, obliqua, binervia, alba, sub apice paginæ externæ antice dense glandipilia. Labellum cum columna connatum, tamen ima basi liberum unguiculatum sagittatum, ligulatum, antice dilatatum, utrinque plica insiliente inflexum, apice reflexo ovato triangulum, carinulis obscuris quaternis ante hunc limbum reflexum. Fovea subquadrata in processum rostellarem linearem extensum. Androclinium angulare. Anthera a basi cordata late rostrata, attenuata, quadrilocellaris. Pollinia gemina, farinosa, alba, superne sulcata, involuta. Caudicula brevis, rufa, glandula elongata, linearis, acuta. Named in honour of Mr. Weir, who collected it.—*Gard. Chron.* 1870, p. 923.

Stachyarrhena, *Hook. f. nov. gen.* (*Rubiaceæ*, *Alibertieæ*). Flores dioici; ♂ spicati, ♀ solitarii. Fl. masc.: Calyx cupularis; limbus brevis, truncatus, obscure 5-lobus. Corolla subcylindrico-campanulata, coriacea, 5-loba, limbo fauceque intus villosa; lobi 5, breves, ovati, contorti. Stamina 5, fauci corollæ inserta, inclusa; antheræ sessiles, lineares, dorso medio insertæ, connectivo apice appendiculato. Ovarium effœtum;

stylus brevis, stigmate fusiformi acuto pilosi. Fl. fœm.: Calyx et corolla . . . Ovarium pluriloculare? stylus . . .; ovula numerosissima, horizontalia, placentis bilamellatis axi ovarii adnatis affixa, lamellis revolutis margine exteriore ovuliferis. Bacca breviter pedicellata, globosa, calycis limbo coronata, pedicello involucello duplici utroque cupulari basi cincto, 4?-locularis, polysperma. Semina horizontalia, majuscula, plana, testa tenui subfibroso-cellulosa . . .—Arbores parvæ, Amazonicæ, glaberrimæ, ramulis lignosis teretibus. Folia opposita, gracile petiolata, oblonga v. lineari-oblonga, obtusa, rigide coriacea, siccitate rufo-brunnea, supra sub lente granulata, nervis divaricatis tenuibus. Stipulæ intrapetiolares, breves, in cupulam connatæ. Flores ♂ in spicas strictas terminales erectas rigidas dispositi, subfasciculati, parvi, albi v. flavidi, ebracteolati. Bacca diametro Cerasi.

S. SPICATA; foliis obovatis oblongisve apice obtusis v. rotundatis, basi in petiolum angustatis, spicis densifloris foliis dimidio brevioribus. —*Schradera spicata*, Spruce, Herb. 3322.—HAB. Amazons' river, near Santarem, and on the Casiquiari, at Vasiva and Pacimoni, Spruce. Fl. January.—*Hook. Ic. Plant.* t. 1068.

STELIS ENDRESII, *Reichb. f.* (*Orchideæ*); æquiflora, dense cæspitosa majuscula, caulibus secundariis elongatis, foliis cuneato-oblongo-ligulatis obtusis apice emarginatis cum apiculo crassis, racemo disticho, ovariis pedicellatis medio genuflexis, bracteis vaginatis acuminatis ovariis pedicellatis bene brevioribus, sepalis ima basi coalitis omnibus intus papulis filiformibus barbellatis, sepalo dorsali ovali acuto trinervi, sepalis lateralibus ovatis apiculatis paulo minoribus, petalis transverse oblongis apice inflexo cucullatis cum apiculo, limbo erecto ciliatulo trinerviis, labello carnoso transverso subrhombeo excavato, columna gracili, androclinio postice cucullato, rostello ligulato erecto, limbo sub fovea bicruri, cruribus ovatis cum apiculo.—Near *Stelis leucopogon*, but with 3-nerved sepals. HAB. Discovered in Costa Rica by M. Endres, and flowered in the Hamburg Botanic Garden in December, 1869, and July, 1870.—*Gard. Chron.* 1870, p. 1373.

S. GLOSSULA, *Reichb. f.*; bilabiata, dense cæspitosa, caulibus secundariis brevissimis, foliis cuneato-oblongo-ligulatis apice minute bilobis cum denticulo, racemo longe distiche florido, bracteis triangulis ovaria longa non æquantibus, sepalo dorsali oblongo obtuse acuto quinquenervi elongato, sepalis lateralibus oblongo-ovatis apiculatis apicem versus connatis subtrinerviis multo minoribus, petalis obtuse rhombeis uninerviis, labello carnoso papuliformi supra dorsum bilamellato, columna subæquali.—HAB. This little species was imported by Messrs. Veitch from Costa Rica.—*Gard. Chron.* 1870, p. 1373.

STROPHANTHUS BULLENIANUS, *Mast.* (*Apocynaceæ*); ramis petiolis pedunculis sepalisque hispidis, foliis elliptico-oblongis, basi rotundatis nonnunquam inæquilateris longiuscule acuminatis supra glabriusculis subtus villosis, petiolis 3–4 lin. longis, spinulas axillares minimas per paria dispositis obtegentibus, cymis ramosis laxis plurifloris bracteatis, bracteis linearibus deciduis, calyce eglanduloso campanulato vix semipollicari profunde 5-partito, laciniis lineari-oblongis, corollæ hypocraterimorphæ tubo basi dilatato erubescente, limbo patente 5-partito, segmentis flavidis purpureo-maculatis ovatis patentibus superne concavis longiuscule acuminatis, æstivatione contorte imbricatis, staminodiis 10 oblongis subcarnosis per paria e fauce tubi inter petala emergentibus, staminibus

5 exsertis, filamentis crassis brevibus subulatis, antheris conniventibus syngenesiis ad apicem trochleariformem styli agglutinatis, connectivo crasso conico intus loculos quatuor ferente quorum exteriores steriles longiores, interiores dimidio breviores polliniferi, ovario ut in congeneribus, folliculis (ex speciminibus exsiccatis descriptis) binis erectis parallelis 20–24 poll. longis lineari-oblongis coriaceo-lignosis apice longissime acuminatis, valvis extus (cortice delapso) fibrosis intus flavidis nitidis, seminibus fusiformibus 14–15 lin. longis lana gossypina albida obtectis.—HAB. Afric. trop. occident. ad Old Calabar, ubi legerunt Mann, n. 1444! 2247! Rev. W. C. Thomson, 22! In. ins. Fernando Po, Mann, 1444! —Some months since we were favoured by Mr. Bullen, the curator of the Royal Botanic Gardens, Glasgow, with specimens of the above-described *Strophanthus*, which proved, on examination, to be identical with native specimens in the Kew herbaria gathered by Mann and by the Rev. W. C. Thomson.—*Gard. Chron.* 1870, p. 1471, and fig. 257.

SWARTZIA MATTHEWSII, *Benth.* (*Leguminosæ, Swartzieæ*); ferrugineo-pubescens, foliolis 4–9 alternis ovatis v. oblongo-ellipticis, racemis axillaribus terminalibusque brevibus confertifloris, calyce aperto cyathiformi, petalo anguste obovali, antheris omnibus lineari-oblongis subæqualibus, legumine longe stipitato compresso.—HAB. Prov. Chachapoyas, Peru, Matthews; Santa Anna (Bolivia?), at an elevation of 3–4000 ft., Pearce. —*Hook. Ic. Plant.* t. 1064.

SYNAPTOLEPIS, *Oliv. gen. nov.* (*Thymelaceæ, Gnidieæ, Diplostemoneæ*). Flores hermaphroditi, pentameri. Perianthium hypocraterimorphum, tubo gracili glabro, limbo 5-partito regulari patente, lobis oblongis imbricatis tubo 3–4-plo brevioribus. Squamæ fauci insertæ, in annulum continuum carnosulum confluentes. Stamina 10, biseriata, inclusa v. 5 longiora faucem attingentia; filamenta filiformia, in tubo inserta; antheræ adnatæ, oblongæ, obtusæ, inappendiculatæ, filamento 3–6-plo breviores. Ovarium subsessile v. breviter stipitatum, angustum, basi subnudum v. squamulis hypogynis laciniatis minutissimis v. obsoletis circumdatum; stylus gracilis; stigma subclavatum. Nux ut videtur perianthii tubo arcte indusiata, tenuiter ossea; semen testa subchartacea glabra. . . .—Frutex verisimiliter, ramosissimus, glaber. Folia parva, opposita, subcoriacea. Flores axillares, subsessiles.

S. KIRKII, *Oliv. sp. unica.*—HAB. Zanzibar, Dr. Kirk.—*Hook. Ic. Plant.* t. 1074.

TABERNÆMONTANA BARTERI, *Hook. f.* (*Apocynaceæ*); glabra, ramulis dichotomis, foliis breviter petiolatis elliptico-oblongis ovatis vel lanceolatis utrinque acuminatis integerrimis membranaceis, pedunculis 3–multi-floris, bracteis parvis ovato-oblongis acutis sepalis ¼ poll. longis oblongis obtusis dimidio brevioribus, corollæ 2 poll. diam. albæ tubo ultra calycem contracto, supra medium infundibuliformi, lobis oblique cuneato-obovatis, folliculis ovoideo-oblongis falcato-recurvis rostratis 1½ poll. longis.—HAB. Upper Guinea, Hort. Kew., gathered by Barter, Dr. Irving, and Mann. Near *T. sessilis*, Benth.—*Bot. Mag.* t. 5859.

TETRALOPHA, *Hook. f. gen. nov.* (*Rubiaceæ, Timonieæ?*). Flores hermaphroditi? Calycis tubus brevis, cupulæformis; limbus annularis, integer. Corolla infundibuliformis, tubo intus lobisque 4 patentibus valvatis dense barbatis. Stamina 4, fauci inserta, filamentis longiusculis sursum incrassatis; antheræ exsertæ, lineari-oblongæ, erectæ, dorso infra medium basi elongata filamento incrassato adnatæ, utrinque obtusæ.

Discus depressus, pulvinaris. Ovarium 2-loculare; stylus 0, stigmatibus 2 brevibus recurvis; ovula in loculis gemina, placentis septo adnatis prominulis inserta, horizontalia, divaricata. Fructus . . .—Frutex? glaberrimus, ramulis teretibus. Folia opposita, breviter petiolata, obovato-oblonga, obtusa v. obtuse apiculata, coriacea, carnosula, siccitate brunnea, nervis tenuibus paucis. Stipulæ breves, intrapetiolares, in annulum connatæ. Cymæ breves, breviter pedunculatæ, axillares, dense fasciculatæ, pedunculis bracteis annularibus instructis. Flores parvi, breviter pedicellati.

T. MOTLEYI, *Hook. f. sp. unica*.—HAB. Borneo, Motley.—*Hook. Ic. Plant.* t. 1072.

VALLESIA HYPOGLAUCA, *Ernst (Apocynaceæ)*.—*Vide Journ. Bot.* Vol. VIII. p. 375.

WENDLANDIA UVARIIFOLIA, *Hance (Cinchonaceæ)*.—*Vide Journ. Bot.* Vol. VIII. p. 73.

Proceedings of Societies.

BOTANICAL SOCIETY OF EDINBURGH.—*Feb. 9th*.—Prof. Balfour in the chair. The following communications were read:—"On *Antholithes Pitcairniæ* and its Fruit (*Cardiocarpon*) and other Fossil Plants found near Falkirk." By C. W. Peach, A.L.S. Last autumn Mr. Peach had collected, near Falkirk, specimens of *Antholithes Pitcairniæ* with its fruit *Cardiocarpon*. The latter had never before been found attached. *Calamites nodosus* was found in great abundance, but very fragmentary; nevertheless, he had been able to make a restoration of the whole plant. Two or three other species of *Calamites* were associated with it, but not in a good state for determination. The leaves of *Flabellaria borassifolia* were abundant, and he was fortunate to find also a couple of specimens of the woody stem of the plant. Many Ferns were also met with, and a *Halonia*, showing leaf-scars and bud-like prominences arranged in a spiral manner on it, differing from the depressed scar markings on *Ulodendron* both in size and arrangement. "Report on the Cultivation of *Cinchona* at Rungbee, Darjeeling." By C. B. Clarke, M.A. "Letter from Prof. Christison to Prof. Balfour regarding the Introduction of *Cinchona* into India." Prof. Christison stated that so long ago as between 1838 and 1842 he urged the Board of Directors for India to introduce the cultivation of *Cinchonas*, pointing out that the alkaloid could be obtained as well from the bark of young twigs as from that of older branches. This memorial was backed by Dr. Royle, but no action was ever taken on it by the Board.

March 9th.—Alexander Buchan, President, in the chair. The following communications were read:—"Report on the Effects of the Cutting Down of Forests on the Climate and Health of the Mauritius." By H. Rogers, M.R.C.P. Lond., and senior Assistant-Surgeon, Civil Hospital, Port Louis, Mauritius. Communicated by the President. "On the Cultivation of New Zealand Flax (*Phormium tenax*)." By Dr. James Hector, Wellington, New Zealand. Communicated by Mr. Sadler. "Notes on the British Batrachian Ranunculi." By Mr. James F. Robinson. After a slight sketch of the history of the nomenclature of the plants, the author gave the results of his observations on some of the formsgrowing in Cheshire, which he considered to range under "four true species," *R. heterophyllus*, Sibth., *R. trichophyllus*, Chaix, *R. circinatus*, Sibth., and *R. fluitans*, Lam. "Report on the Open Air Vegetation at the Royal Botanic Garden." By Mr. M'Nab. "Statistics of the Botanical Class in the University of Edinburgh from 1860 till 1870 inclusive, being a Continuation of the Statistics from 1777 to 1859," published in the Society's Transactions, vol. vi. p. 296–298. By Prof. Balfour.

Literary and Philosophical Society of Manchester.—*Jan.* 9th.—J. Baxendell, President of the Section, in the chair. "On *Carex flava*, L., and its allies, of the Manchester Flora," by Charles Bailey; illustrated by a large suite of specimens. The prevailing form in the district, and one very common to the south of Manchester, is the *Carex lepidocarpa*, Tausch.; this is the *C. Œderi*, Sm., and of Grindon's 'Manchester Flora,' and the *C. flava*, var. *β* of 'Buxton's Guide.' The true *C. flava* (*a. genuina*, E.B.), as stated long ago by Mr. Buxton, is nowhere met with in the district. Specimens of *C. Œderi*, Ehrh., from Mere Mere, the locality mentioned in Buxton's 'Botanical Guide,' were recently exhibited at a meeting of the Society, and the sandhills at Southport are, so far as I know, the only other locality in the neighbourhood for this species. There is some confusion in the nomenclature of the group, and the characters given in our standard authority—'English Botany,' 3rd edition—do not altogether dispel it. In that work, Dr. Syme describes *C. eu-flava*, *β. lepidocarpa*, as usually having the male spikes sessile or subsessile, and the female spikes as being all approximate, or the lowest a little remote when its stalk is said to be wholly included within the sheath. The Manchester plant, however, has the male spike stalked, the peduncles being often of great length, while the female spikes are scarcely approximate, but rather scattered, and the lower spike is generally produced, its stalk being conspicuously exserted. The fruits are more narrowed at the base than represented in 'English Botany,' and the bracts are very long, much exceeding the male spike. There are two forms of *C. lepidocarpa*, Tausch., in the district; the more common one, which occurs in fields and open ground, has the leaves as long as or longer than the somewhat thick and rigid stems, but the latter are without the roughness at the summit described by Grenier and Godron in their 'Flore de France;' the fruit is slightly inflated, and the beak long but straight. The single specimen which I possess of Billot's No. 2159 (Fl. Gall. et Germ. Exsicc.) closely approaches this form, but it is less rigid, and has only a single spike of fruits. The other form, occurring in damp ground amongst long grass, is much taller and more slender than that just named; its stems exceed the leaves, and the fruit is less inflated, so as to be gradually attenuated into a beak. Some plants of this form, which I collected at Oakmere, Cheshire, and at Whaley Bridge, Derbyshire, near the reservoir, agree very well with the plant issued in Wirtgen's Herb. Plant. Select., fasc. vi. n. 267, the chief difference being that the Rhenish plant has the beak more recurved. Billot's specimens of *C. flava*, L., from the fosse of the citadel of Strasburg (n. 2158), quoted by Dr. Syme as synonymous with his var. *a. genuina*, do not quite agree with any Scotch or north English plant which I have gathered or seen. Dr. Syme describes the female spikes of *genuina* as not contiguous, but they are all contiguous in the Strasburg plant, while the leaves are rather longer than the stems, and the lowest bract greatly exceeds the male spike,—the contrary being stated in 'English Botany' to be the case. It may be mentioned that Godron, in the Fl. de France, t. iii. p. 424, like Dr. Syme, divides *C. eu-flava* into var. α *genuina* and β. *lepidocarpa*, the former having approximate, and the latter slightly scattered spikes, while the var. α. *genuina* of 'English Botany' has the spikes not contiguous, and β. *lepidocarpa* all approximate. The plants of the north of England which I have examined agree better with Godron's characters. The figure of *C. Œderi*, Ehrh., given in 'English Botany,' plate 1674, very accurately represents the plants of Mere Mere and Southport, which also agree with Belgian specimens published in Van Heurck's 'Herbier des Plantes Rares ou Critiques,' n. 189. But Dr. Syme quotes Billot's plant (Fl. Gall. et Germ. Exsicc., n. 1352) as identical with this species, whereas the specimens in my set differ greatly from the 'English Botany' plate and description. In Billot's plant the male spikes are on long stalks, while the female spikes are widely separated from each other, and are not as spreading as they are represented in 'English Botany;' the fruits also differ in not being abruptly narrowed or inflated, and the beak, instead of being short and straight, as in the Manchester plants, is somewhat long and slightly recurved. It is worth noticing, as bearing upon the specific distinctness of this plant, that M. Crépin, in his 'Manuel de la Flore de Belgique,' mentions that it is remarkable in its shoots, putting forth every year new tufts of leaves and new stems, which I understand to mean that fresh stems appear simultaneously with the new leaves, instead of the stems being produced from the tufts of the preceding season, as in most sedges.—Mr. Sidebotham, who also exhibited a large series of each of the plants from various localities, gave it as his opinion that they were three distinct species, not difficult to separate even in their extreme forms; and he extended to all three the remark of Dr. B. Syme, in the new edition of 'English Botany,' where he says, that although it might sometimes be difficult at first sight to distinguish the species, when a dried specimen only was seen, he had never found the least difficulty when the plants were growing. The following short characters were, he thought, quite sufficient to separate the species from each other: —*Carex flava;* fruit yellow, nuts large, beak very long, deflexed. *C. lepidocarpa;* fruit pale green or yellowish-green, nuts smaller and beak shorter than in *C. flava*, beak straight. *C. Œderi;* fruit pale yellow, nuts very much smaller than preceding, and more globular, beak very much shorter, straight. He had never gathered *C. flava* in the Manchester district, although abundant in the north of Lancashire; *C. Œderi*, he reported as occurring abundantly at Llandudno. [Is typical *C. Œderi* ever found away from the coast in England?]

Botanical News.

Dr. Hooker, Mr. Ball, and other friends are about to start on a trip to Morocco, and will penetrate into the interior if a safe-conduct can be obtained from the Emperor of that semi-barbarous state. One of the young gardeners from Kew will accompany the party to assist in collecting plants.

Dr. Seemann returned from Nicaragua on the 14th of last month, bringing with him several new and interesting plants from the Chontales gold region.

Mr. R. Chambers, the supposed author of 'Vestiges of Creation,' is dead.

The 11th and 12th decade of vol. xxii. of Reichenbach's 'Icones,' recently published, continues the illustration of the genus *Trifolium;* the details of the species are extensively and accurately figured.

From the thirteenth Annual Report of the East Kent Natural History Society, we regret to learn that the investigation of the flora of East Kent was unavoidably checked during last year. We trust the Society will earnestly set to work again this season at this inquiry. Any notes on the subject will be gladly received by J. Reid, Esq., Bridge Street, Canterbury.

We notice the publication of Prof. De Notaris' 'Epilogo della Briologia Italiana.'

The Pharmaceutical Society offers to its students under the age of twenty-one a silver medal for the best herbarium of Phanerogams and Ferns collected in any part of the United Kingdom between May 1, 1871, and June 1, 1872. The specimens are to be arranged by the natural system, and sent in before the 2nd of July, 1872. Should more than one candidate be entitled to a reward, a bronze medal will be given to the second in merit.

The vacant Professorship of Natural History in Queen's College, Belfast, has been filled by the appointment of Dr. R. O. Cunningham, an ardent naturalist, who has but recently returned from the survey by H.M.S. Nassau of the Strait of Magellan, and has just published a volume of Notes on its Natural History.

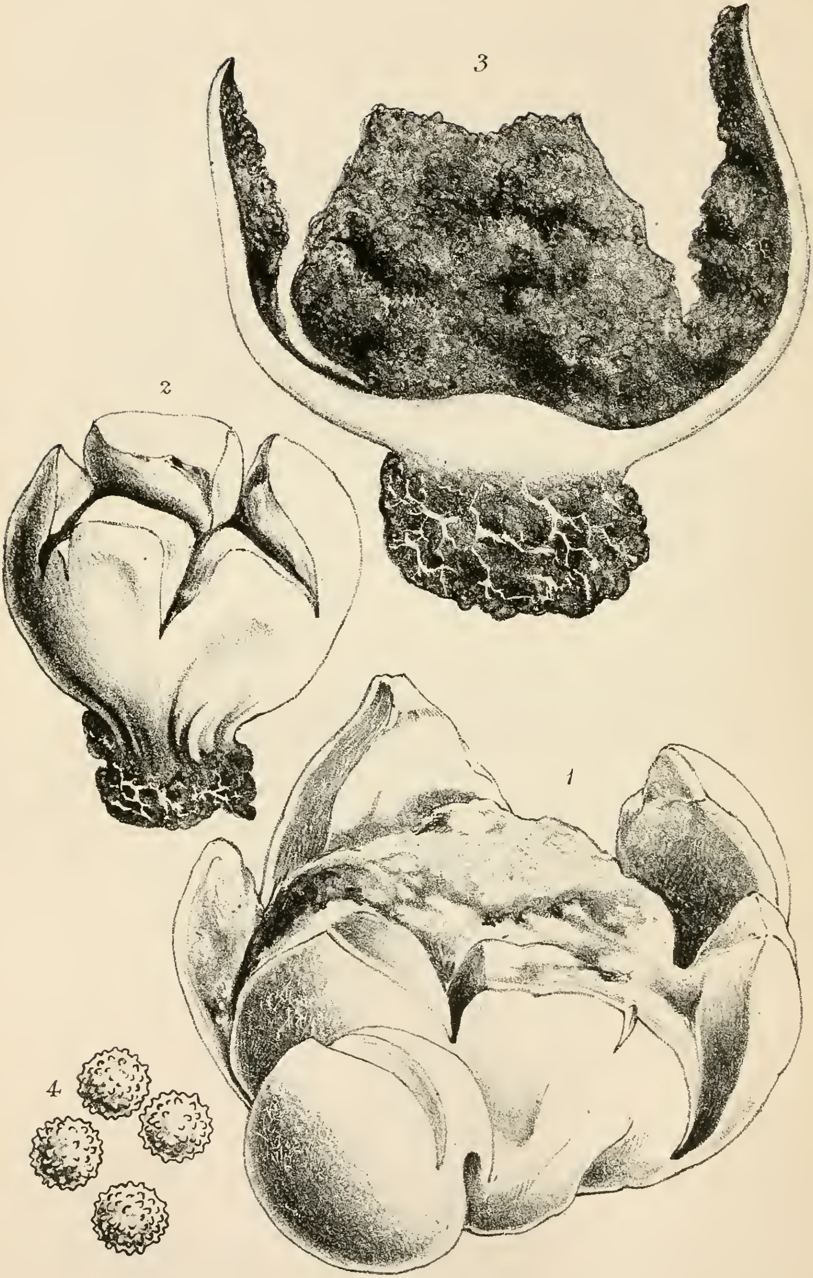
Mr. Alfred Smee, F.R.S., is engaged in writing a book upon his garden at Carshalton, Surrey. Besides descriptions of all the plants wild and cultivated there, a great number of illustrations will be given.

Dr. Karl Heinrich Schultz-Schultzenstein, of Berlin, one of the most eminent botanists in Germany, was found dead in his bed on the morning of March 23rd. He had been engaged at his desk until past midnight. The deceased, though in his seventy-third year, was remarkably active, and was a lecturer on physiology as well as on botany in the University of Berlin, with which he had been connected since 1822.

A bust of Mr. J. J. Bennett has been executed by Mr. H. Weekes, R.A., and placed in the Botanical Department of the British Museum, with which Mr. Bennett was so long connected.

COMMUNICATIONS have been received from—J. Sadler, Prof. Thiselton Dyer, Dr. Boswell Syme, J. R. Jackson, T. B. Flower, J. Britten, Prof. Church, W. Carruthers, etc.

Tab. 116.



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Scleroderma geaster. Fr.

Original Articles.

SCLERODERMA GEASTER, *Fr.*, A NEW BRITISH FUNGUS.

BY C. E. BROOME, F.L.S.

(PLATE CXVI.)

Micheli was the first to distinguish *Scleroderma Geaster*, Fr., in his 'Nova Genera Plantarum,' p. 219. t. 99. fig. 1, where he published it as a distinct species under the name of *Lycoperdastrum rotundum majus*. After that it appears to have been passed over by botanical writers till Persoon took it up and designated the genus *Scleroderma*, from its hard integument; his specific name for our plant, *polyrhizum*, seems to have been less suitable, as it applies equally to others of the genus.

Fries, in his 'Systema Mycologicum,' iii. 46, named the species more appropriately *S. Geaster*, on account of its resemblance to the plants of that genus. In his monograph of the *Lycoperdaceæ*, Vittadini remarks that the species of *Scleroderma* are few, but so variable in character that they are only to be recognized after a long acquaintance. The differences in the colour of their peridia, the size and form of the uterus, and the presence or absence of a stem, he considers of little moment, nor are those consisting in the colour of the flesh and spores much more reliable, for the same species exhibits these of various tints, according to differences of soil and atmosphere; much depends on the slowness or rapidity of development, which are manifestly connected with climate and temperature. He places more reliance on a careful comparison of specimens from different localities, and collected under various atmospheric conditions, combined with careful microscopical study of the fructification. The greater number of so-called species the Italian botanist refers to *S. vulgare*, F., *S. Geaster* being the only other with which he is acquainted which he thinks worthy of specific rank. He describes it as possessing a very thick peridium splitting at the apex in a stellate manner, with a smooth, somewhat silky or furfuraceous cortex, of a yellowish-grey colour. The flesh black or brown-purple, and the spores olive-brown.

Vittadini describes two varieties, the first is emergent, sessile, globose, or transversely elongate; flesh at first watery-white, then black, variegated with white walls. The inner substance of the peridium, when recent, whitish-yellow; when dry, of a pale woody tint, rather corky; in the young condition, when dry, strongly plicato-rugose, with black flesh almost stony in consistence, shining when rubbed. This is frequent near Milan in oak- and pine-groves in autumn. The second variety is developed beneath the soil, substipitate, pear-shaped, 2–5 inches across; peridium 2–3 lines thick, purplish-white within, clothed with scales mixed with sand, and of a permanent yellow colour, scarcely rugose when dry; flesh at first watery-white, hard, at length of a dirty purple colour, soft, variegated with white flocci. He adds that he long considered these varieties as distinct species, relying on Fries, who thought their characters permanent; but afterwards, on seeing *S. Geaster* in various localities and soils, he found that the one form evidently passed over into the other, the flesh assuming every tint between black and bluish-purple.

The species is distinguished from the rest of the genus by the singular thickness of its peridium, and the smoothness of its bark, but especially by the stellate mode of the dehiscence of the peridium.

Fries gives Southern Europe and Carolina as its localities; to these may be added La Calle, in Algeria, as Montagne informs us in the 'Flore d'Algérie,' and Australia, Drummond, n. 168. A comparison of the spores of the British plant with those of specimens from Carolina exhibits scarcely any difference, both being rough and varying from 0·0003 to 0·0005 inch diameter.

Explanation of Plate CXVI.—Fig. 1, 2, 3. *Scleroderma Geaster*, Fr., from specimens collected by Dr. Bull, near Hereford, in Oct. 1870. Fig. 4. Spores magnified 700 diameters.

SERTULUM CHINENSE SEXTUM: A SIXTH DECADE OF NEW CHINESE PLANTS.

By H. F. Hance, Ph.D., etc.

1. *Lathyrus (Orobus) Davidii*, n. sp.; glaberrimus, caule angulato, foliis 3-jugis petiolo apice cirrhifero foliolis membranaceis subglaucescentibus reticulato-venosis subrhombeo-ellipticis utrinque obtusis setaceo-apiculatis, stipulis foliolis duplo brevioribus ac angustioribus semisagittatis auriculis deorsum productis vix divaricatis obtusiusculis integerrimis vel subundulatis, pedunculis 12–15-floris folia vix æquantibus, calycis dentibus superioribus brevibus triangulatis 3 inferioribus longioribus lineari-setaceis, corolla (teste Davidio) albida, leguminibus immaturis glaberrimis anguste linearibus 3½-pollicaribus.

In silvis montosis ditionis Pekinensis, m. Julio florentem, legit rev. pat. Armandus David. (Exsicc. n. 14880.)

This species, of which the absence of ripe fruit on my specimen precludes my giving a fuller diagnosis, is allied to *L. maritimus*, Big., and *L. pisiformis*, L., and is doubtless the unnamed plant alluded to in Maximowicz's 'Index Floræ Pekinensis.' In referring it to the section *Orobus*, I understand that group as limited by Alex. Braun and other recent writers.

2. *Abrus mollis*, n. sp.; longe diffusa atque volubilis, caulibus ramisque pilosis, foliis 11–16-jugis petiolis fulvo-villosis foliolis tenuibus lineari-oblongis supremis plerumque obovatis truncato-obtusis setaceo-apiculatis 9–12 lin. longis 3–4 lin. latis venis inconspicuis supra pubenti-pilosis subtus dense villosis, racemis fulvido-villosis folium dimidium circiter æquantibus, floribus 3-linealibus roseo-purpureis secus rachin in nodis brevissimis 4–8 glomeratis, calyce dense incano, vexilli ungue limbo triplo breviore vaginæ stamineæ adhærente, leguminibus 1¾ poll. longis pilosis oblongis compressis apiculatis circ. 8-spermis, seminibus ovoideis compressis fusco-brunneis nitidis strophiola parva apice in corniculum protracta annuliformi hilum perforatum funiculum rigidum legumini adhærentem excipiens cingente.

In frutectis saxosis ad Shek-mun, juxta Cantonem, d. 8 Augusti 1869, primus detexit filius meus Alfredus; in silvula ad cœnobium Sheung-king-tái, infra verticem montium Pak-wan, m. Septembri ejusdem anni iterum invenit clarus Sampson. (Exsicc. n. 15806.)

This species, which, like *A. cantoniensis*, has carunculate seeds, is in the

size and shape of its leaflets and in inflorescence not unlike *A. tenuiflorus*, Spruce; and I believe it is closely allied to that, and probably also to *A. melanospermus*, Hassk., to judge from the description. The presence of stipellæ in this genus, which I had supposed myself the first to indicate (Seem. Journ. Bot. Vol. VI. p. 113) had, I find, already been detected by my acute friend Dr. Thwaites (Enum. Pl. Zeyl. p. 91) in *A. pulchellus*, Wall.

3. *Combretum (Eucombretum) Alfredi*, n. sp.; frutescens, erecta?, innovationibus dense flavo-glanduloso-lepidotis, ramis ferrugineo-tomentosis subquadrangulis, foliis petiolo 3-lineali suffultis coriaceis oblongo-lanceolatis acuminatis minute calloso-apiculatis integerrimis opacis flaventi-viridibus $4\frac{1}{2}$–6 poll. longis $1\frac{1}{2}$–$2\frac{1}{2}$ poll. latis utrinque punctis minutis elevatis asperiusculis albidis densissime obsitis subtusque præterea granulis glandulosis flavo-brunneis conspersis luci obversis sub lente creberrime pellucido-punctatis costulato-penninerviis costulis utrinque circ. 7–8 axillis obscure barbatis costa venisque subtus prominulis hirtellis, spicis axillaribus et terminalibus paniculatis laxis folio parum brevioribus, rachi ferrugineo-tomentosa, bracteis foliis homomorphis sed multo minoribus, bracteolis setaceis, calycis extus flavido-lepidoti tubo ovario duplo longiore limbo ad medium usque 4-fido laciniis triangulatis acutis erectis fauce annulo densissimo pilorum flavorum exsertorum coronata, petalis flavis unguiculatis obovatis acutiusculis lacinias calycinas parum superantibus, fructu . . . ?

Juxta viam a ripa fl. West River ad ingentem rupem calcaream Kai-kun-shek, i. e. 'petra cristæ galli' ducentem, 120 mill. pass. a Cantone occasum versus, de 15 Julii 1870 detexit filius meus Alfredus. (Exsicc. n. 16694.)

Allied somewhat to *C. Wightianum*, Wall., and probably still more to *C. neurophyllum*, Miq., and *C. sarcopterum*, Thw., and several Moluccan species, none of which, however, I have seen.

4. *Angelica citriodora*, n. sp.; caule simplici erecto glaberrimo tereti elevato-striato striis infra inflorescentiam minute serrulatis 2–4-pedali, foliis paucis distantibus petiolo basi vaginante suffultis inferioribus bipinnatis 2–3-jugis foliolis 2–1-jugis superioribus pinnatis vel trisectis summis abortivis foliolis sessilibus vel brevissime petiolulatis oblongo-lanceolatis integerrimis acutis opacis infra pallidioribus luci obversis pellucido-venulosis margine cartilagineo minute serrulato cinctis costa venisque asperis 8–14 lin. longis 3–4 lin. latis, umbellis 7–11-radiis, umbellulis 12–14 radiolatis, involucri involucellique phyllis 7–8 linearibus reflexis radiis radiolisque linea elevata minute denticulata notatis duplo triplove brevioribus, calycis dentibus ovato-triangulatis prominulis, petalis albis distincte et abrupte unguiculatis orbiculato-ovatis acumine rigido inflexo, fructu elliptico compresso glaberrimo, mericarpiorum jugis primariis lateralibus in alas latas expansis dorsali et intermediis elevatis in fructu immaturo tantum fistulosis omnibus cum valleculis univittatis, commissura lata bivittata, stylopodia conspicuo, stylis rectis vel demum recurvis, carpophoro bipartito, semine facile a pericarpio secedente vittis tamen pericarpio adhærentibus.

Ad cacumina montium Pakwan, supra Cantonem, d. 8 Octobris, 1869, sparsim obviam invenerunt Sampson et Hance. (Exsicc. n. 16393.)

The plant itself is quite scentless, but the fruit—fresh or dried, ripe or unripe—when cut across, exhales a powerful and most delicious odour,

precisely similar to that of candied citron peel. By the prominent calyx-teeth and the fistular juga (which character, however, disappears in the ripe fruit) this agrees with the species separated by Hoffmann under the name of *Ostericum;* by its infrajugal vittæ it, however, differs, I believe, from any *Angelica* hitherto described. In young fruit the vittæ are made out with the greatest difficulty, but in mature ones, after maceration, they are very conspicuous. I think the increase in the number of these organs in the Chinese plant, taken in connection with the fact, as stated by Mr. Bentham (Gen. Plant. i. 917), that in some species of *Archangelica* they cohere with the fruit rather than the seed, points to the advisableness of suppressing the latter genus.

The discovery of this plant is particularly interesting, as affording another instance of the extension of northern Asiatic forms to South China, to which I have already on several occasions directed the attention of botanists. The genus *Angelica* (as comprehensively, and I believe naturally, characterized by Mr. Bentham) is, unless I err, entirely absent from southern Asia; whilst, as compared with other umbelliferous genera, it is richly represented on the north-eastern Asiatic seaboard. Excluding *Archangelica* (which, as mentioned above, I should prefer to unite), Maximowicz and Regel enumerate six species from Russian Manchuria, and the former author two—probably new ones—from the neighbourhood of Peking; whilst the island of Sachalin, not yet thoroughly explored, has, according to F. Schmidt, four; not of course all different from those of the mainland. Miquel records only three from Japan, but there can be little doubt this number will be augmented; though, as Ruprecht, in his 'Revision der Umbelliferen aus Kamtschatka,' counts but two species from those regions; Regel and Tiling two from Ayan in eastern Siberia; and Trautvetter and Meyer only one from Ochotsk; we can scarcely perhaps expect additions from the northern parts of the empire.

5. *Abelia adenotricha*, n. sp.; frutescens, ramis oppositis, virgatis teretibus basi perularum squamis persistentibus brunneis scariosis auctis junioribus pilis e tuberculo ortis apice capitato-glandulosis densiuscule hirtis vetustioribus cum caule eorumdem basibus asperatis cortice pallide brunneo, foliis ovatis acutis integerrimis 1–2 poll. longis, 6–13 lin. latis, petiolo bilineali suffultis utrinque sed præcipue subtus dense adpresse strigoso-hirtis subtus tenuiter elevato-reticulatis, pedunculis ad ramulorum furcaturas ortis solitariis dense glanduloso-pilosis $\frac{1}{2}$–1$\frac{1}{4}$ poll. longis apice bracteis binis foliaceis lanceolatis glanduloso-pilosis totidem flores fulcientibus munitis, floribus in pedunculo sessilibus, corolla? (delapsa), achæniis bracteas subæquantibus oblongis pilis capitatis dense obsitis circ. 4 lin. longis calycis 4-partiti laciniis oblongis acutiusculis uninerviis glanduloso-pilosis inter se inæqualibus ipso achænio triplo brevioribus coronatis.

In vicinitate Jehol specimina fructifera m. Maio invenit rev. Armandus David. (Exsicc. n. 14715.)

A species very distinct by its hairy foliage, glandular pubescence, long naked peduncles, and small fruiting-calyx, apparently coming nearest my *A. Davidii.* It is a matter for regret that the corolla of neither of these two, nor of *A. Hanceana*, Mart., discovered by me on the mainland opposite Amoy, should be yet known. The present plant, in the herbarium, has considerable general resemblance to *Lonicera Maximowiczii*, Rupr. or *L. chrysantha*, Turcz.

6. *Loranthus Sampsoni*, n. sp.; ramis teretibus cortice griseo crebre verruculoso, innovationibus rufo-lepidotis, foliis oppositis et alternis breve petiolatis elliptico-lanceolatis obtusiusculis demum glabris coriaceis obscure penniveniis 12–16 lin. longis, 3–4 lin. latis, pedunculis axillaribus solitariis vel geminis folium dimidium subæquantibus apice flores 3–2–1 pedicellis brevibus basi articulatis insidentes tetrameros semi-pollicares basi bractea cucullata acuta extus suffultos gerentibus, alabastris basi tetragonis, calycis margine haud producto truncato, petalis liberis a basi dilatata linearibus sub anthesi a medio arcte refractis rubris sparsim rufo-lepidotis, staminum petala æquantium filamentis superne liberis antheris linearibus, ovario urceolato rufo-furfuraceo, stylo stamina vix superante stigmate capitato.

In arboribus secus amnem Loting, provinciæ Cantoniensis, m. Junio 1865 invenit cl. T. Sampson. (Exsicc. n. 9013.)

In the dilated bases of the petals this agrees with De Candolle's *Eulo-ranthi unguiculati*, which, however, Professor Oliver has pointed out (Linn. Journ. Bot. vii. 101) cannot be separated from the *breviflori* of the same author. In inflorescence, except that the peduncle is much longer, it resembles *L. memecylifolius*, W. and A. (belonging to quite another section), and would, I suppose, come under Oliver's § 20. This mode of inflorescence, usually described as umbellate, should rather be called cymose; and, except that the flowers are pedicelled, is similar to that of the Xylosteous *Loniceræ*. The flowers are usually two only, and the pedicels divaricating.

7. *Campanula (Eucodon) veronicifolia*, n. sp.; radice crasse fibrosa, caulibus 1–1½-pedalibus erectis angulosis pilosis superne paniculato-ramosis, foliis tenuibus pilosis oblongis acutis inferioribus in petiolum alatum longe productis reliquis basin versus angustatis sessilibus margine acute serratis 1–2 poll. longis, medio 3–5 lin. latis, bracteis foliis homomorphis sed minoribus, floribus pedunculatis, calycis strigoso-hispidi tubo subgloboso laciniis lanceolatis acutis parum breviore, corollæ campanulatæ pallide cæruleæ extus pilosæ ad medium usque 5-fidæ lobis lanceolatis acutis calyce paulo longioribus, antheris vix ad basin corollæ loborum attingentibus, ovario triloculari, stylo robusto corolla breviore stigmatibus tribus linearibus crassis recurvis.

In alluviis fluvii North River, ditionis Cantoniensis, versus finem m. Februarii a. 1869, detexit Sampson. (Exsicc. n. 15477.)

Very closely allied to *C. colorata*, Wall. The leaves are a good deal like those of *Conyza japonica*, Less. (=*C. veronicifolia*, Wall.).

8. *Linaria (Linariastrum) quadrifolia*, n. sp.; erecta, simplex, glaberrima, foliis lanceolato-linearibus acutis trinerviis nervo medio subtus prominulo omnibus quaternatim verticillatis axillis sæpe foliiferis verticillis intervallo foliis ipsis fere æquilongo sejunctis, racemo conferto, pedicellis glaberrimis bractea subbrevioribus calyci circiter æquilongis, laciniis calycinis ovato-lanceolatis acutis, corollæ 8–9 lin. longæ luteæ palato barbato crocco calcare tubi longitudine vel eo breviore (capsula seminibusque ignotis).

In ditione Pekinensi rarius vigentem invenit rev. A. David. (Exsicc. n. 15594.)

This plant was taken by its discoverer for *L. vulgaris*, Mill., from which it is surely distinct by its much smaller flowers, smooth pedicels, and especially by the leaves arranged in distant whorls of four. In the ab-

sence of ripe fruit and seeds, it is impossible to say whether it belongs to the subsection *Grandes* or to *Speciosæ;* but I believe its nearest ally to be *L. geminiflora*, F. Schmidt, of which I possess specimens from the Manchurian coast (Bushnell), and from Sachalin (Conolly). It is perhaps the plant doubtfully referred by Bunge to *L. linifolia*, respecting which he gives no further information.

9. *Macaranga Sampsoni*, n. sp.; arborea, dioica, ramis ramulis petiolisque flocco fulvo demum deraso vel evanescente obtectis, foliis coriaceis orbiculari- vel deltoideo-ovatis breviter calloso-dentatis apice subito angusto-cuspidatis basi late rotundatis atque angustissime peltatis penniatque basi subpalmati-nerviis junioribus fulvo-floccosis maturis supra glaberrimis subtus ferrugineo-hirsutis atque granulis flavis glandulosis dense obsitis costulis venisque secundariis infra prominulis 5–6 poll. longis, 3¼–5 poll. latis, petiolo 2–5-pollicari pubescente, paniculis ♂ folio triplo brevioribus a basi fere ramosis, bracteis trilinealibus ovato-lanceolatis caudatis utrinque 1–3-dentatis dense ferrugineo-hirsutis atque glandulis nonnullis flavis conspersis, floribus 5–6 fasciculatis bracteis superatis, perigonii profunde 3-lobi lobis ovatis acutis villoso-hirsutis, staminibus plerumque 3 rarius 4 antheris semper 4-locularibus, paniculis fructigeris laxis petiolo plerumque circ. æquilongis, bracteis uti in ♂, capsulæ coccis binis ultra medium connatis ovoideis subcompressis inermibus glandulis ceraceis flavis densissime obtectis 2–2½ lin. longis, stigmatibus arcte adpressis recurvis coccorum verticem attingentibus, seminibus ovoideis testa fusca rugosa.

In silvis supra cœnobium, Ting-ü-shan, secus fl. West River, 80 mill. pass. a Cantone occasum versus ♂ floriferam d. 15 Junii 1869, eodemque loco denuo ♀ fructigeram d. 10. Julii 1870, legit indefessus Sampson. (Exsicc. n. 15620.)

This falls into Joh. Mueller's section *Mappa;* but it does not agree apparently with any species described by him, and his subdivisions are purely artificial, and arranged solely to facilitate determination; though the characters he relies on are by no means constant, as, for example, the relative length of limb and petiole. Dr. Hooker has recently, in his edition of the late Professor Harvey's 'Genera of South African Plants,' restored the genus *Mappa*. It seems to me, however, impossible to regard it as generically distinct from *Macaranga*, which in respect of priority is eighteen years older. *Mappa*, moreover, is objectionable as a name, from its too great resemblance in sound to the Olacaceous genus *Mappia*.

10. *Rottböllia mollicoma*, n. sp.; culmis farctis erectis 4–5 pedalibus tomentosis hinc latere canaliculatis, foliis e basi rotundato-cordata lanceolato-linearibus acuminatis cum vaginis nodisque dense molliter sericeohirsutis inferioribus pedalibus et ultra 8 lin. latis, ligula scariosa vix producta, spicis axillaribus solitariis folio diu involutis fragillimis tripollicaribus, spiculæ sessilis gluma exteriore crassa dimidiato-ovata conspicue tessellato-scrobiculata pilosa, spicula pedicellata ad rudimentum minimum reducta.

In fossis et ad margines fruticetorum ins. Danorum, Whampoæ, primus detexi m. Octobri 1861. (Exsicc. n. 7558.)

Apparently a quite distinct species, which Dr. Thwaites considers very close to his *R. nigrescens;* which it is not unlike in aspect, though with broader leaves, and differences in the floral characters.

A SUPPLEMENT TO THE 'FLORA VECTENSIS.'

By Alexander G. More, F.L.S., M.R.I.A.

(*Continued from page* 76.)

†*Matthiola incana*, R. Br. First noticed in Snooke's 'Flora Vectiana' (1823) as a *Cheiranthus*, not easily accessible, growing on the cliff between Compton and Freshwater Gate. Probably an escape from cultivation at some remote date.

Nasturtium officinale, R. Br., var. *siifolium*, Reich. Millpond at Lower Knighton, and in Alverstone Lynch.

Obs. *Barbarea vulgaris*, R. Br., "var. β." Dr. Bromfield's specimens, gathered at Calbourne, seem to be merely a form of *B. vulgaris*, and certainly do not belong to *B. stricta*, Fries. Mr. J. G. Baker refers them to *B. vulgaris*, var. *sylvestris*, of Fries.

Cardamine sylvatica, With. Omitted in 'Flora Vectensis.' Is not unfrequent in damp woods and moist shady places. (See 'Phytologist,' vol. iii. p. 337.)

**Diplotaxis tenuifolia*, De Cand. On the high bank above Cliff End Fort, from 1865 to 1868, in no great quantity, and probably introduced (Dr. G. R. Tate).

†*Brassica oleracea*, L., has quite disappeared from the foot of Culver Cliff (F. Stratton). Though the kind of locality seemed wild enough, and the "Wild Cabbage" was gathered there for many years, still I am inclined to think it may have originated, like the *Matthiola*, from some seeds accidentally brought by the wind or other accident.

[*Alyssum calycinum*, L. A few plants growing among clover at Lower Hide Farm, near Shanklin, 1858 (Rev. T. Salwey); not noticed since. Evidently introduced with the clover-seed.]

Draba verna, L. The varieties *Erophila majuscula*, Jord., and *E. brachycarpa*, Jord., occur in company with many intermediate forms, which I cannot strictly refer to any of Jordan's species. On St. Helen's Spit I have found a few plants with elliptical pods, nearly, if not quite, as much inflated as in the alpine variety "*inflata*."

Cochlearia officinalis, L. Round the new fort at the Needles (Dr. G. R. Tate); at the foot of the cliff in Scratchell's Bay.

C. anglica, L. West bank of the Medina (F. Stratton); salt-marshes at Newtown (J. G. Baker); on the Down between Alum Bay and the Needles (Dr. G. R. Tate), a most unusual locality; shores of Wootton Creek.

C. danica, L. On the shingly beach below Tyne House, Bembridge, in 1861, probably the offspring of seeds transported from the mainland; at the Needles Fort, in 1868 (Dr. G. R. Tate); at King's Quay, plentifully, in 1869 (J. Pristo and F. Stratton).

[*Camelina fœtida*, Fries. Among Flax; in a field of Vetches and Oats at Pan, near Newport, 1870 (F. Stratton, 'Journal of Botany,' Vol. VIII. p. 256).]

†*Thlaspi arvense*, L. Among turnips at Sandford, near Godshill, in some plenty, October, 1860.

[*Iberis amara*, L. One plant only, gathered by Mr. Stratton in Grange Chine, near Brightstone, 1868: certainly an escape.]

†*Lepidium Smithii*, Hook. In ground recently disturbed at the back

of Sea Grove, near Sea View, abundant in July, 1858, less so in 1859–60, and not a root left in 1863. Hedge close to the windmill at Bembridge, 1859, probably sprung from seeds conveyed with corn. I have seen *L. Smithii* in Ireland and in North Wales in situations where it has every appearance of being native.

‡*Coronopus didyma*, Sm. A single plant in a garden at Niton (Miss E. S. Kirkpatrick); on a bank surrounding the farmyard at Dodner, near Newport, in some plenty; also by the Medina at West Medina Mill. By the shore at East Cowes, and in the Queen's brickyard in Whippingham (F. Stratton).

[*Isatis tinctoria*, L. In a field of sown grass at Bembridge in 1858. Only two or three plants in the following year.]

Raphanus maritimus, Sm. On shingle in a little cove between Steephill and St. Lawrence (A. J. Hambrough); "very sparingly in 1858, as if recently established," but tolerably abundant from 1859 to 1862. Probably the seeds were drifted from Freshwater Cliffs.

Crambe maritima, L. A single root "of doubtful origin" in a cove near Steephill! (A. J. Hambrough); one plant by the pier at Osborne (J. Pristo and F. Stratton, 1867); in Totland Bay, 'Phytologist,' N. S. vol. ii. p. 204. 1857.

Reseda lutea. Downs above Ventnor and Steephill (A. J. Hambrough); cornfields at St. Lawrence and near Ashey; a few plants on St. Helen's Spit, conveyed with chalk marl; a single root on the shore at Sea Grove, similarly introduced; on the race-course on Buccombe Down (R. Tucker). No doubt introduced in many of its localities.

Helianthemum vulgare, Gærtn. Var. "β. petalis basi aurantiis," Snooke in his 'Flora Vectiana,' p. 22. This variety is by no means rare in the Undercliff, and I have also found it on Ashey Down. The flowers are marked with a dark yellow or orange ring at the base of the corolla; sometimes this ring is double, and I have seen occasionally a few purplish marks towards the top of the petals in the same flowers, but in other respects the variety does not differ from the usual forms of *H. vulgare.*

Viola hirta, L. With pinkish or flesh-coloured flowers at Luccombe, perhaps a hybrid between *V. hirta* and *V. odorata.*

V. sylvatica, Fries; *V. Reichenbachiana*, Bor. In woods and shady places about Bembridge; in Centurion's Copse abundantly (1860); at Brading, Puckpool, Quarr Copse, Binstead, and in the landslip at Luccombe, but much less common than *V. Riviniana.*

V. canina, L. and Fries. Pasture field between St. Helens and Fivens, 1859; in heathy ground near Ninham Farm; top of Shanklin Down, a plant or two only; foot of Bleak Down, near Godshill (A. J. Hambrough); quite rare.

†*V. tricolor*, L. At Shanklin I have found in arable land a few plants with large and altogether purple petals: also near Ryde a plant or two which seem to belong to *V. tricolor* rather than to *V. arvensis.*

Polygala depressa, Wand. On St. Boniface Down and Colwell Heath (A. J. Hambrough); on Pan Common, and, I believe, frequent in heathy and boggy places on sand.

Dianthus Armeria, L. Apparently quite extinct in the Isle of Wight. I have sought for it unsuccessfully for several years in the only known locality, a sandpit at the side of Morton Lane.

[*D. prolifer*, L. The sandy banks and pasture ground where it used to grow are now completely built over.]

Obs. *D. deltoides*, L. Was observed by the Rev. E. Venables in the grounds of "The Hermitage," growing on land previously cultivated. Miss E. Twining included *D. deltoides* in a list of Isle of Wight plants which she sent to Mr. Watson, but I fear that the plant has no claim to be considered native, or even permanently established.

**Saponaria officinalis*, L. Cliff below the Fort at Freshwater Gate, but not native (H. C. Watson); hedge close to Brightstone, an escape from or adjoining to a garden (R. Tucker).

Obs. *Silene noctiflora*, L. Must be erased from the Isle of Wight list, as Mr. Hambrough told me that he felt uncertain about the single specimen which he once picked when out shooting.

Sagina ciliata, Fries. In a furze brake at Steephill (A. J. Hambrough); on a bank near Sandown; in the Warren at Alum Bay; at Luccombe; gravel pit at the junction of the roads to Fishbourne and Ryde (Rev. A. M. Norman), etc., but far less common than *S. apetala*.

S. ambigua, Lloyd. On sandy banks near the Fort in Sandown Bay, 1856. This is, I believe, a seaside form of *S. ciliata*, with fleshy leaves and stouter habit.

S. subulata, Sw. On Freshwater Down, near the site of the former lighthouse (A. J. Hambrough).

‡*Spergula arvensis*, L. In the Isle of Wight I have found only the variety *β. vulgaris* (Bönng.). This agrees with the experience of Le Jolis and Mabille on the opposite coast of France.

Stellaria neglecta, Weihe. In damp shady places, rather scarce. North side of Centurion's Copse, 1860; roadside near Apse Heath and near Shanklin; in Cowpit Cliff Wood, with pedicels quite glabrous and smaller petals; near Landguard Farm and near Great Combley Farm. Well marked in the most typical form by the ten stamens, the long-reflected pedicels, and the large petals, which catch the eye even when the flower is closed; but it must be confessed that plants often occur which it is difficult to refer to *S. neglecta* or *S. media*.

S. Boræana. Jord. = *Alsine pallida*, Dum. Sandhills at St. Helens and above Sandown Bay. Still less distinct from *S. media* than the former. Ryde and Niton (Bromf.), sub var. γ.

Cerastium triviale, *β. holosteoides*, Fries. On the top of Shanklin Down, sparingly; on Bembridge Down, near the Fort, with *C. pumilum*, 1858.

C. pumilum, Curt. Abundant on Bembridge Down, especially near the edge of the cliff, 1858; on Brading Down; Afton Down, Freshwater. This plant is very different from both *C. semidecandrum* and *C. triviale*, but is very closely allied to *C. tetrandrum*, to which it is indeed joined as a variety by Cosson and Germain. Besides that the edge of the bract is membranous, the stems of *C. pumilum* branch in a more regular manner from about the middle, while in *C. tetrandrum* the stems branch from quite low down, and the dichotomy is developed on one side only. In the shape and veining of the petals, *C. pumilum* agrees closely with *C. tetrandrum*, while both differ from *C. semidecandrum*. The plant mentioned by Dr. Bromfield as growing near the Ferry House at St. Helen's is *C. tetrandrum*.

C. tetrandrum, Curt. Occurs in a few places at some distance from the sea, as on Ninham Heath and Pan Common. I once found on Pan Common a few plants with the foliage and stems quite glabrous, calyx also glabrous and bordered with purple, and which seem analogous to the corresponding variety *holosteoides* of *C. triviale*.

Arenaria leptoclados, Guss. In cultivated fields and on wall-tops; more frequent than the typical *A. serpyllifolia*. At Bembridge, 1859, Ryde, Godshill, Sandown, Freshwater, etc.

A. Lloydii, Jordan. Plentiful on the sandhills of St. Helen's Spit, 1859. On the site of the former Needles Lighthouse (H. C. Watson).

Lepigonum rupicola, Lebel. Plentiful on the rocks in the landslip at Luccombe, 1859; cliffs under Bonchurch and Ventnor; along the Undercliff and at Niton and Blackgang; sandy cliffs at Brightstone; Compton Bay, and all over the cliffs at Freshwater. A very distinct species.

L. rubrum, Fries. Sandy heaths; about Godshill, Sandown, etc.; frequent.

Lepigonum salinum, Presl.; *L. neglectum*, Kindberg, olim. On banks and waste places near the sea, and in salt marshes, plentiful on the north side of the Isle of Wight (1860). In the marshes north of Brading Harbour I have found what I believe to be the true *L. medium* of Fries, a smaller plant with smooth seeds and a leafy panicle.

L. marinum, Wahl.; *L. marginatum*, DC. Very common in the wettest part of salt marshes, on ground occasionally overflowed at high tide. I have tried the experiment of sowing the seeds in ordinary soil, and the plants which came up still retained the characters and habits of the parents.

[*Hypericum hircinum*, L. A single bush was once found by the Rev. T. Salwey at Shanklin, growing on a hedgebank close to a garden.]

Obs. *H. maculatum*, Flor. Vect. Appendix. Mr. J. Woods kindly sent me the specimen which he found near Ninham Farm, and having myself gathered the same plant in this locality, I cannot but consider it a form of *H. perforatum*. It has the leaves all perforated with numerous pellucid dots.

Geranium Robertianum, L., var. *purpureum*, Forst. At the foot of the Culver Cliff (Rev. W. W. Newbould); in Steephill Cove, with *Raphanus maritimus* (J. G. Baker). The plant on the shore near the Priory seems to agree best with *G. semiglabrum* of Jordan.

G. molle, L., var. *parviflorum* (var. γ, of Bromfield). On St. Helen's Spit, etc. A small-flowered and procumbent variety, with leaves more deeply cut than usual.

G. pusillum, L. Roadside at Yaverland, sparingly; field between Grove and Alverstone; near Godshill.

[*G. pratense*, L. A single plant on the border of a grass field close to the barracks at Sandown; no doubt introduced.]

[*G. striatum*, L. Appears well established in the hedge of a cottage garden at Alverstone. Mr. J. Pristo has also sent me a specimen found in a hedge near Wootton, where it has been observed for several years.]

[*Erodium moschatum*, Sm. On a strip of turf under the paling of a cottage garden at St. Helen's Green (1860). Not now cultivated, but no doubt introduced in so suspicious a locality.]

Oxalis Acetosella, L. The variety with purplish flowers grew formerly in a wood near Landguard (Major Smith).

Ulex Gallii, Planch. Heath east of Newport (1852). Stapler's Heath, and the south-east parts of Parkhurst Forest, always accompanied by plants intermediate between it and *U. nanus* (F. Stratton, 1868). Le

Jolis finds the same connecting links at Cherbourg, and describes no less than eighteen forms. (Mém. Soc. Scient. Nat. de Cherb. vol. i. 1853.)

U. nanus, Linn. On St. Helen's Spit, near Sandown, Shanklin, Newport, and in other parts; frequent, and usually accompanied by *U. Gallii.*

OBS. *Ononis arvensis*, L. The variety β, mentioned by Snooke, in his 'Flora Vectiana,' p. 28, and which I have gathered between Brading and St. Helen's, is a form of *O. arvensis*, rather more spinose than usual, not *O. campestris*, Koch, which has not yet been found, though recorded by Dr. Bromfield and Dr. Trimen, as occurring on the opposite coast of Hampshire.

Medicago denticulata, Willd. On the sea-bank near Quarr Abbey.

**Melilotus arvensis*, Willd. Among clover and sown grass in cultivated fields, and on their borders; frequent, but apparently introduced with the crop. Bembridge Down, 1856. St. Lawrence, Freshwater, etc. Probably nearly all the localities given by Dr. Bromfield for *M. vulgaris*, Willd. (*M. alba*, Lam.), belong really to *M. arvensis.*

[*M. alba*, Lam., *M. leucantha*, Koch. Clover field at Alverstone, Whippingham (J. Pristo).]

Falcatula ornithopodioides, Brot. On the village green at St. Helen's. Near Totland's Bay (Dr. G. R. Tate).

Trifolium medium, L. North side of Brading Down (Major Smith). Banks near Cowes, (Snooke, in Fl. Vect.) Parkhurst Forest (F. Stratton).

T. arvense, L. Knighton East Copse, by the footpath; rarely seen inland.

T. striatum, L. In Totland's Bay (G. R. Tate); near the Post Office at Freshwater (R. Tucker); plentiful in a lane near King's Quay (J. Pristo).

T. scabrum, L. Compton Bay (A. J. Hambrough); Watcombe Bay; and Hampstead Spit.

T. glomeratum, L. Earthen bank on St. Helen's Green; above Red Cliff in Sandown Bay with *Vicia lathyroides*. Blackgang! (E. Crosfield) I suspect that the locality of St. Catherine's, given for *T. suffocatum* belongs rather to this species.

[*T. hybridum*, L. Parkhurst Forest, and about Whippingham. Blackwater, etc. (F. Stratton); plentiful in a clover field at Hampstead (J. G. Baker).]

[*T. patens*, Schreb. One root in a clover field between Thorley and Ningwood (J. G. Baker).

T. filiforme, L. Near Bembridge; St. Helen's Spit; top of Shanklin Down; pastures near the Wilderness, Luccombe, etc.; but not common.

[*Vicia lutea*, L. "In Mr. Watson's herbarium a specimen is preserved, which was sent to him by Miss M. M. Atwood, who has kindly informed me that it was gathered by Miss Furber on a rough piece of waste ground near Sandown in 1860;" Mr. T. B. Flower, who has seen a memorandum left by Dr. Bromfield, to the effect that he had heard of the occurrence of the plant, but had not seen a specimen.]

V. angustifolia, var. *segetalis*, Thuil. Hedges near Hillways, Bembridge, 1860. Hedge near Freshwater House (J. G. Baker). Hedges near East Standen, and at Alverstone (F. Stratton).

V. lathyroides, L. Near the footpath along the top of Red Cliff in Sandown Bay, sparingly (1860).

OBS. *Lathyrus maritimus*, Bg. I fear some mistake about this plant.

On the beach in Sandown Bay, and also on the shore at Shanklin, I have found stunted plants of *L. sylvestris*, which may have led to the error.

**Onobrychis sativa*, Lam. In no locality where it can be considered indisputably native. The banks and slopes on which it occurs are always adjacent to cultivated land, or have themselves in many cases been ploughed. On Bembridge Down close to tilled ground. Above a chalk-pit on Arreton Down, but close to a cultivated field. On Afton Down and Buccombe Down, the relics of cultivation (R. Tucker).

‡ *Prunus domestica* (Flora Vectensis). From its round fruit and thorny branches is, I believe, the same as the *P. insititia* of the French Floras, and most authors; while Dr. Bromfield's "*P. insititia*" is in great part the *P. fruticans* of Grenier and Godron, Boreau, etc. Both look as if planted originally in the hedges where they usually occur.

**Poterium muricatum*, Spach. Only in and near to cultivated fields; plentifully in a field of sown grass at Bembridge in 1858. A few plants by the roadside on Ashey Down, and plentiful in an adjacent cultivated field, 1858; near Steephill (Mr. Hambrough). In a field of sown grass above Great Wood, Shanklin.

Agrimonia odorata, Mill. In thickets and under hedges, rare. About Niton (Mr. W. Mathews, 1855, 'Phytologist,' N.S. vol. i. p. 191). A few plants in Marshcombe Copse, Yaverland; in Bordwood Copse; hedge south of Briddlesford Heath. Hedge near Merry Gardens (Rev. H. H. Crewe). Near Merston (F. Stratton).

[*Alchemilla vulgaris*, Linn. A single patch was found (1849) by Dr. Bell Salter in the grounds of Tyne Hall, Bembridge, where it had been no doubt introduced.]

RUBUS. Mr. J. G. Baker, during a short visit which he paid to the Isle of Wight in the summer of 1868, made a collection of all the forms which he saw, amounting to about fifty, and has kindly favoured me with the following notes:—

Rubus suberectus, Anders. Seen only once, but very characteristic as regards prickles, etc., in the Tinker's Dell, in Apse woods.

R. plicatus, W. et N. Plentiful in the marsh at Freshwater gate, and gathered also on Ningwood Common.

R. rhamnifolius, W. et N. Several forms which Babington would include here. Bloxam's typical *rhamnifolius*, with a small, long-stalked, finely-toothed, terminal leaflet, scarcely cordate at the base, in hedges, at Stapler's Heath, near Newport; a larger, more cordate-leaved form, with the inflorescence scarcely more than racemose, near the same place; a form quite agreeing with the common north country plant, which Bloxam and Warren call *affinis*, on Colwell Heath; and a plant with cordate leaves a good deal felted beneath, at Ningwood Common.

R. Lindleianus, Lees. Satisfactory and typical, in the Tinker's Hole, at Apse, and at Stapler's Heath, near Newport.

R. corylifolius, Sm. Next to *discolor*, apparently the commonest Bramble everywhere through the island.

R. Balfourianus, Blox. I saw a plant which Babington places here in a hedge at Brading, and again in two or three places along the Undercliff, west of Ventnor. This is not exactly Bloxam's original *Balfourianus*, and differs from *corylifolius*, principally by the sepals adpressed to the fruit. Genevier labels it "*degener*."

R. discolor, W. et N. By far the commonest Bramble through the island, keeping its characters well, as it does in Yorkshire, not running into other things (*leucostachys*, *macrophyllus*, etc.) as it does about London. The universal Vectian form is the common English one, *R. rusticanus* of E. Mercier and Genevier.

R. cæsius, L. Tolerably common, but not so much as it often is. A remarkably prickly form by the roadside at Norton.

R. thyrsoideus, Wimm. A form agreeing with the plant of Bloxam's fasciculi, on the commons at Colwell and Hampstead.

R. leucostachys, Sm. Everywhere common about Shanklin, but not seen along the Undercliff, where, indeed, there is little else but *discolor; leucostachys* gathered also in several places about Newport, and in a hedge midway between Yarmouth and Freshwater Gate, and a shade form in Beckett's Copse.

R. Salteri, Bab. The original place at Apse woods, is a good station for studying this, as it runs up from the original *Salteri* into Bloxam's large strong *calvatus*. I saw it also in several other places about Colwell, Calbourne, and Ningwood.

R. carpinifolius, W. et N. Just Bloxam's plant (*umbrosus*, Arrh.), in the *Calamintha sylvatica* dell, at Apes Down.

R. macrophyllus, Weihe. In a lane, near the stream just out of Calbourne, westward. Bloxam's *macrophyllus*, which is Babington's only in part.

R. rudis, Weihe. Very characteristic, in the lane between Calbourne and the Apes Down farmhouse.

R. Sprengelii, Weihe, var. *Borreri*. Roadside, half a mile out of Newport towards Ryde.

R. fusco-ater, of Bloxam and Babington's last two editions. Colwell Heath, sparingly.

R. nemorosus, of Babington's earlier editions and Bloxam's fasciculus, including under this name the *diversifolius* and *tuberculatus* of Babington's last edition; it is common about Freshwater, Yarmouth, and Shalfleet; varying much in the quantity and strength of the prickles, and the stem either without hairs or with a considerable quantity.

R. rosaceus, Weihe. Hedge out of Newport or little westward, and fine in Beckett's Copse, near Freshwater. Two common Brambles I did not see anywhere, were *Radula* and *pallidus*, the latter a universal wood Bramble wherever else in England I have been."

[*Rosa Sabini*, Woods. Mr. J. G. Baker has informed me that he saw a specimen labelled, as found in the Isle of Wight, in Mr. Watson's collection of British Roses, which was destroyed by the fire which also consumed the whole of Mr. Baker's own herbarium. Possibly this may be identical with the plant mentioned by Bromfield as growing at Apse Heath.]

R. tomentosa, Sm. Bembridge, St. Helens, Combley Wood, Shanklin, etc.; usually in small quantity, but abundant in many places near Godshill. In a lane south of Calbourne (J. G. Baker). I have not seen *R. villosa*, L. (*mollissima*, Willd.).

†*R. rubiginosa*, L. Pasture-field above the Bathing House of Bembridge Lodge. Landslip, not far from Bonchurch. Among Furze, on St. George's Down, near Newport (F. Stratton). Satisfactorily wild, growing with *R. micrantha*, in the lane along the foot of Westover Wood, near Calburne (J. G. Baker). I fear that this is always sown by birds or otherwise introduced.

R. canina, Linn., var. *tomentella*, Leman. In hedges between Easton and Freshwater, very characteristic; also near Ryde (J. G. Baker), var. *Andevagensis*, Bast.; in a hedge just out of Calbourne, westward (J. G. Baker), var. *dumetorum*, Thuill.; in Rosemary Lane, near Ryde (J. G. Baker).

R. systyla, Woods. Hedge at Oakfield, near Ryde! (Dr. Bell Salter).

Cratægus Oxyacantha, L. I have seen *C. monogyna*, Jacq., only.

Epilobium obscurum, Schreb. Pan Common (1858), Newchurch, Shanklin, etc.; but far less common than *E. tetragonum*, which is very frequent along roadside ditches, in wet copses, etc.

[*Œnothera odorata*, Jacq., was sown by me on St. Helen's Spit, about 1858, and has since been seen growing there by Dr. Trimen and Mr. F. Stratton.]

Callitriche hamulata, Kütz. In a pool, at Staplers, near Newport (F. Stratton). This specimen has the narrow elongated lower leaves so characteristic of the plant when growing in mountain lakes, but the upper leaves and fruit are precisely the same as in the *Callitriche* which grows at Knighton, and has leaves all short and narrowly obovate.

A barren form of *C. vernalis*, with the leaves all linear, occurs in streams, and this, when cultivated, soon produces the obovate upper leaves characteristic of *C. vernalis*.

C. obtusangula, Le Gall. In ditches running through Barnsley Marshes, on the north side of Brading Harbour ('Journal of Botany,' Vol. VIII. 1870, p. 342).

Obs. *Ceratophyllum*. Major Smith has left a note to the effect that it was probably *C. demersum* which Dr. Bromfield found at the back of Lower Morton Farm, and that he had himself found it in the same locality. I have often searched for it without success. *Chara* and *Myriophyllum* both grow in these ditches. Dr. Bromfield states in the 'Phytologist' that *Ceratophyllum* is wanting in the Isle of Wight.

Obs. *Lythrum Hyssopifolia*, L., has not been rediscovered, though often sought, and Mr. Stratton has ascertained that Mr. Kirkpatrick always believed that it had been introduced with grass seeds sown in the meadow which lies on the east bank of the Medina, close to Mr. Kirkpatrick's garden.

†*Sedum Telephium*, L., *purpurascens*, Koch. Beckett's Copse, Freshwater. On a hedgebank near Godshill; but in the latter station associated with a foreign shrub and probably introduced. South side of Brixton Down (Garnier and Poulter in 'Hampshire Repository,' p. 120).

†*Ribes*. All the three species, though seemingly wild in many different localities, are, I suspect, like the Wild Apple, always the offspring of seeds scattered by birds or carried by streams from the parent shrubs so generally cultivated in gardens.

Chrysosplenium oppositifolium, L. Almost entirely restricted to the sand. The only place where I have seen it on the north side of the chalk is along a little stream running from Nunwell Down to Brading, and Mr. Stratton finds it sparingly in Spring Lane, Carisbrooke.

‡*Smyrnium Olusatrum*, L. Wild enough at present; but, I believe, always an escape from, or the remains of, former cultivation.

Helosciadium nodiflorum, L., var. *ochreatum*, De Cand. Ditches on St. Helen's Green. This is the *H. repens* of most English authors, but not of Continental writers, who all agree in ascribing a general involucre of several leaves to *H. repens*, and this I have not seen in any British specimens, except those preserved in Sir J. E. Smith's Herbarium, as from Guillane Links, near Edinburgh.

Crithmum maritimum, L. A few roots on a narrow strip of shingly beach at the west mouth of Newtown Creek, a most unusual locality. At Norton, and in Gurnet Bay (F. Stratton). Dr. Trimen has noticed a similar kind of station on the beach at Hayling Island.

[*Viscum album*, L. On an Apple-tree in the garden at Osborne, where it has been noticed for many years (J. Pristo). Introduced and growing luxuriantly in Mr. Dennett's garden at Carisbrooke (F. Stratton).]

Sambucus nigra, L., var. *rotundifolia*, Bromf. A young bush with leaves trifoliate, but less exactly round, and more serrated than in Dr. Bromfield's plant, was found by Mr. Hambrough and myself near St. Lawrence.

Galium, hybrids. *G. vero-mollugo*. In 1858, I gathered in a hedge on Ashey Down a few specimens intermediate between *G. Mollugo* and *G. verum*. The two specimens which I have preserved are different from each other. One, with broader and more pubescent leaves, shows more resemblance to *G. Mollugo;* the other, with narrow leaves, is more like *G. verum*. These apparently answer to the descriptions given of *G. approximatum* and *G. decolorans* by Grenier and Godron, 'Flore de France,' vol. ii. pp. 19, 20, and Boreau, 'Flore du Centre de la France,' ed. 3, p. 302.

? *G. erectum*, Huds. Dr. Boswell-Syme has kindly examined some specimens of the small *Galium* of the Chalk Downs, gathered at Bembridge and at Freshwater, and thinks they should be referred to *G. erectum* rather than *G. Mollugo*. (See Dr. Bromfield's remarks in 'Phytologist,' o. s., vol. iii. p. 423.)

G. palustre, L., var. *elongatum*, Presl. Not unfrequent along the ditches in Sandown Level.

[*Crucianella stylosa*, Trin. Well established in a lane leading from the Carisbrooke road to the Castle road, (F. Stratton), 1866–8. (See Journ. Bot. Vol. VII. p. 316. A native of Persia.]

**Centranthus ruber*, De Cand. Quite naturalized, and yearly increasing on the cliffs to the west of Niton.

Valeriana officinalis, L. The form *sambucifolia* is the only one which I have seen.

[*Valerianella carinata*, Lois. Appeared occasionally as a weed in the garden at Vectis Lodge, Bembridge, where it was not intentionally cultivated.]

**Nardosmia fragrans*, Reich. I have observed for many years thoroughly established about Bembridge, Shanklin, Ryde, Wootton Bridge, etc., and I believe that it may be counted as truly naturalized.

Cineraria campestris, Retz. Found in 1868 by Mr. J. G. Baker and Dr. G. R. Tate growing plentifully on the south-east slope of Westover Down, close to the road passing through Calbourne Bottom. The words "Belhan, pl. I. W.," quoted by Dr. Bromfield from the 'Hampshire Repository,' are not necessarily intended for any locality, but should doubtless be read as referring to Relhan's Plate in his 'Flora Cantabrigiensis,' which is quoted by Garnier and Poulter as the authority for *Cineraria alpina*, just as on the same page (121) "With. pl.," must be read as a reference to a plate in Withering. The letters "I. W." simply indicate, as in other cases, that the plant had been seen somewhere in the Isle of Wight.

**Inula Helenium*, L. Rough, bushy ground north of Luccombe Chine, in one spot only; border of Woodhouse Copse, Osborne (J. Pristo); near Norton and Shalfleet (Dr. G. R. Tate); in a field near Totland Bay and at Gurnet (R. Tucker); a plant or two near Alvington (F. Stratton). I believe always the remains of ancient cultivation, though now thoroughly at home in many different localities.

Pulicaria vulgaris, Gært. On the west side of the Wilderness at Rookley (A. J. Hambrough).

Filago spathulata, Presl. In sandy fields about Alverstone, Grove, Newchurch, Bordwood, etc.; roadside on Messley Down and near Thorley Farm. At Brook, Colwell and Freshwater (H. C. Watson).

†*Tanacetum vulgare*, Linn. Bank above the road near Alverstone Lynch; edge of a sandpit by the road near Bembridge Farm; at the west mouth of Wootton Creek; east bank of the Medina, below Newport (F. Stratton). In all cases probably an escape from cultivation.

Arctium majus, Schk. Hedgebank, near the Quay at Brading (1858); copse, between Yar Bridge and Sandown; Whitefield Wood; Marshcombe Copse, Yaverland; in Sea View Bay; Appuldurcombe Park. In the Wilderness at Rookley (T. W. Beddome). Decidedly rare.

A. intermedium, Lange, *A. pubens*, Bab. Ashey Down (1859); Shanklin; Luccombe, Newchurch; Godshill, etc. Not unfrequent, and shows a decided preference for a calcareous soil. Near Bembridge I have found what I believe to be *A. nemorosum*, Lej.; but I do not feel certain that I have properly distinguished it.

A. minus, Schk. Bembridge; Ashey; Sandown; Pan Common, etc. Apparently the commonest form.

"*Carduus Forsteri*." Dr. Bromfield's specimen preserved at Kew is very like *C. palustris*, with, perhaps, a slight dash of *C. arvensis* rather than *C pratensis*. Nägeli describes a hybrid, *C. arvensi-palustre*, in Koch, Syn. Fl. Germ. p. 1000.

Centaurea nigra, L. After collecting a large number of specimens, I have felt quite unable to refer them with any confidence to the various plants described in the French Floras. Usually the *Centaurea* with radiant florets has smaller heads, and the scales of the involucre less closely covered. These characters are also found in a dwarf plant without radiant florets gathered on Bembridge Down, which I believe is the same as that which Mr. Stratton finds on the Downs near Newport with rayed florets. I feel sure no reliance can be placed upon the different length or amount of pappus, as on plants otherwise exactly alike I have found it long and short and wanting. With regard to the form described by Mr. Stratton in the 'Exchange Club Report' for 1869, I should refer his n. 1 to *C. nemoralis* of Jordan, which I have noticed not unfrequently in the damp, clayey meadows about Bembridge, this being apparently the typical *C. nigra* as understood in England. Mr. Stratton's no. 3—the plant common on chalky banks seems to be *C. serotina*, Bor., (the var. *decipiens* of Babington), to which I should also refer the dwarf plant of the Chalk Downs, whether rayed or not. Mr. Stratton's no. 2 is somewhat intermediate, but nearer to *C. serotina*.

†*Hypochæris glabra*, L. Sandy cultivated field near Alverstone Mill, by the footpath to Newchurch.

Tragopogon pratensis, L., var. *grandiflorus*, Syme. In a lane near Easton, Freshwater (J. G. Baker).

**T. porrifolius*, L. By a stream running into the Medina below Newport (F. Stratton); bank near East Medina Mill (J. Pristo). I do not know whether it is permanently established.

Sonchus oleraceus, L., var. *lacerus*, Willd. Foot of Whitecliff, and banks by the shore between Luccombe and Bonchurch.

Taraxacum officinale, Wigg., var. *erythrospermum*, Andrz. Sandhills at St. Helen's Spit and chalk downs, frequent.

T. officinale, var. *T. udum*, Jordan. Wet pastures near Bembridge and St. Helen's. Dr. Bell Salter's specimens from near Ryde belong to this form, and not to the typical *T. palustre*, which, so far as I know, has not yet been found in the Isle of Wight.

[*Crepis biennis*, L. Appeared (1868) as a troublesome weed in a field recently laid down in Grass at Alverstone, Whippingham (J. Pristo and F. Stratton).]

[*C. setosa*, Hall. Clover fields near Totland's Bay, at Boldner and at Compton (J. G. Baker); Headon Hill and Thorley (Dr. G. R. Tate).]

(*To be continued.*)

NOTES OF PLANTS OF THE NEIGHBOURHOOD OF OXFORD.

By W. T. Thiselton Dyer, B.A., B.Sc.

Floras for the counties drained by the upper waters of the Thames are still to be worked out. It would be an interesting contribution towards them to explore thoroughly the country about Oxford, taking both sides of the Thames valley, although distinguishing, of course, for the benefit of future workers in each county, the plants which belong to Oxfordshire and Berkshire. Botanists residing at the University unfortunately go away too soon in the summer and come back too late to do very much, yet even what is to be seen of the local vegetation is well worth hunting up. As little has been published since Walker's 'Flora' (which is quite out of date), the following notes will probably be useful to some readers of the 'Journal of Botany:'—

Ranunculus pseudofluitans, Newb. ex Bab.—The marshy meadows about Oxford are intersected by numerous anastomosing branches of the Thames. In early summer these are often covered by dense masses of an aquatic *Ranunculus*, bearing a profusion of large and handsome flowers. It seems to me a state of *R. floribundus*, Bab., without floating leaves, which is all I take *R. pseudofluitans* to be.

R. Drouetii, Schultz, a Batrachian, distinguishable from *R. trichophyllus*, Chaix, by its collapsing leaves, is probably distributed throughout the Thames basin. Near Bablock Hythe Ferry, Berks.

R. fluitans, Lam.—I never detected this species myself, probably from its being a June-flowering plant, and later, therefore, than *pseudofluitans*, which is at its prime in May. I have what I take to be an example of it from Professor Lawson. Water-plants come to the front or rather surface, make their show of flowers, and retire in regular succession (see below with respect to *Potamogeton*). The useful observers who attend to the time of flowering would do really important work if they would fix for us the date at which plants are at their fullest development, which I take it would be when they have a maximum number of flowers expanded.

This would be of more biological significance than the date when the first bloom struggles into notice.

Caltha palustris, L.—I collected a considerable series of specimens of this fine plant from Christ Church Meadow, where, after the subsidence of the floods, it makes a splendid show. They probably include *C. Guerangerii*, Bor., in which the sepals being more ovate do not overlap at the base. The flowers I found varied from 2¼ to 1¼ inches in diameter, and with from 8 to 5 sepals. The radical leaves were, in some cases, almost orbicular, with overlapping lobes; in others triangular-reniform, with a very shallow basal sinus, a form which, except that the flowers are the normal size, must approach *C. flabellifolia*, Pursh. The toothing of the upper leaves varied to any extent.

Arabis Turrita, L.—Although given for Oxford in the 'Student's Flora' and the 'Compendium of the Cybele Britannica,' it is no longer to be found growing there spontaneously. It was exterminated in repairing the walls of Magdalen College. Mr. Baxter informed me that it lingered in Magdalen walks, and that he endeavoured to establish it in the island in the Cherwell, but was unsuccessful.

Sisymbrium Irio, L., comes up abundantly in the Botanic Garden, outside of which it has occurred occasionally as an escape, as in the adjoining lane leading to Christ Church Meadow, and by the side of the Cherwell, next the garden.

Dianthus cæsius, Sm., is now well established on many of the old limestone walls, and was said to have been introduced directly from Cheddar. It grows, amongst other places, on the garden-wall of Wadham College, and near the entrance to the Cathedral. I have also noticed it on walls in Taunton, Somerset.

Geranium rotundifolium, L.—Abundant about the Oxfordshire suburbs of Oxford. I do not recall its occurrence on the southern side, though, no doubt, it is to be found.

Geum intermedium, Ehrh.—Sparingly, with *G. rivale*, L., and *G. urbanum*, L., in a copse, near Elsfield, Oxfordshire.

Sanguisorba officinalis, L.—Abundant in meadows by the Thames, near Sandford, Berks. Likely to be overlooked, as the early leaves are cut with the grass.

Hippuris vulgaris, L.—Binsey Common, Berks.

Sedum dasyphyllum, L.—Walls at Besselsleigh, Berks.

Œnanthe silaifolia, Bieb.—Christ Church Meadow, abundant near the "Barges." Also in meadows by the river near the old railway station.

Œ. Lachenalii, Gmel.—Bullingdon, Oxon, H. Boswell.

Œ. fluviatilis, Colem.—There is an early stage of the growth of this plant, which is not, I think, described by Mr. Varenne in his paper in the 'Phytologist' (o. s. vol. iv. p. 673). My specimens, collected towards the end of April, exhibit a short corm-like rhizome, about an inch in length, with very abbreviated internodes, and terminated apparently by the base of the flowering stem of the preceding year. A tuft of leaves, about ten inches long, has sprung from one of the nodes. These leaves are not bipinnate, but only pinnate; the pinnæ bipinnatifid, with rather narrow, almost laciniate segments. The general outline of the whole lamina is oblong, and about four inches in length. Another barren specimen, collected at the end of May, agrees exactly with Mr. Varenne's description, being an elongated stem rooting at the nodes, and with leaves decaying upwards. The leaves are triangular in outline, bipinnate, and with wedge-shaped segments. This is the common form. I think my earlier specimen may be the base of an old seedling, perpetuated by a lateral shoot, a short, vertical rhizome being a common structure in the *Umbelliferæ.* The stems of the other type are developed from lateral buds in similar *elongated* submerged stems towards the autumn, the parent stems afterwards breaking up, and decaying. Mine, I think, was wholly a spring growth. I have since seen specimens of *Œ. pimpinelloides*, L., in the British Museum herbarium, collected by Mr. A. G. More in the Isle of Wight evidently early in the year, which show that in that species, the mode of growth is just the same as in my specimen of *fluviatilis.*

Hieracium amplexicaule, L.—Only to be found within the limits of the Botanic Garden, where, at the foot of old walls, it is well established.

Fraxinus heterophylla, Vahl.—The tree (of course planted) mentioned by Walker still stands, though not very healthy, near the eastern end of the broad walk in Christ Church Meadow.

Linaria purpurea, L.—Walls of churchyard, Iffley, Oxon.

Lathræa squamaria, L.—Copse near Cumnor Hurst, Berks, but west of the high-road.

Teucrium Scordium, L.—Banks of the Thames, Godstow, Berks, H. Boswell.

Lamium maculatum, L., var. *lævigatum*, L.—Island in the Cherwell, by Christ Church Meadow, abundant, but no doubt originally derived from the Botanic Garden.

Primula variabilis, Goupil.—Copse near Botley, Berks.

Chenopodium murale, L.—Near the railway station, Oxford.

Polygonum mite, Schrank.—Port Meadow, Oxon; probably to be found in low ground near the Thames throughout its course. It occurs all along the Middlesex bank.

Aristolochia Clematitis, L.—Abundant and very striking in its exotic-looking aspect on the side of a deep ditch bounding one side of part of the precinct of the nunnery at Godstow, Berks, now used as a kitchen garden. It has no relation to the present cultivation, but is the last relic of the ancient use of the ground.

Salix decipiens, Hoffm.—A large tree, mentioned in Walker's 'Flora,' stood in Christ Church Meadow near the "Barges," but was blown down some years since. A small tree of what I take to be the same species grows by the side of the bounding ditch.

S. Hoffmanniana, Sm.—By the Thames between Iffley and Kennington Island, Oxfordshire side.

Leucoium æstivum, L.—Osier Holt between Iffley and Sandford, also Kennington Island; both on Oxfordshire side of river.

Tulipa sylvestris, L.—By the path round Christ Church Meadow, especially close to the trunks of trees. A most stunted state, hardly to be recognized except from the bulbs, and never flowering.

Gagea lutea, Ker.—I have seen a single specimen, obtained by the Rev. T. O. Marshall, from the *Lathræa* locality on Cumnor Hurst, but I never succeeded in finding any more.

Stratiotes aloides, L.—Pond in Magdalen Meadows; originally planted, and afterwards lost. Recently replanted by Professor Lawson.

Potamogeton eu-pectinatus, Syme.—This seems to be the commoner segregate in the Oxford waters.

P. prælongus, Wulf.—Abundant in Thames between Oxford and Sandford. This fine species flowers earlier than *P. lucens*, L., which occupies often the same spots. The surface of the water, covered in May with the spikes of *prælongus*, a month later I have found to show nothing but those of *P. lucens*. The spikes are probably buoyed up above the water by the development of the peduncles. *P. prælongus* is stated in the 'Student's Flora,' to flower, from June to July. I should imagine this to be too late, as I collected it in the middle of May, and some of the foliage was already decaying.

Acorus Calamus, L., is very abundant along the Thames banks, certainly on the Berkshire side. Easily recognizable from the waved margins of the leaves.

Carex axillaris, Good.—Marston Lane, H. Boswell.

SHORT NOTES AND QUERIES.

Cyperus Fuscus not a Native.—This plant was first figured as a British plant by Sir W. Hooker in his continuation of Curtis's 'Flora Londoniensis,' vol. iv. dated 1821 (see 'Flora of Middlesex,' 298), with the following remark:—"For this valuable addition to the flora of the British Isles the botanical world is indebted to that zealous and able naturalist A. H. Haworth, Esq., who found it in a low, marshy meadow scarcely half a mile from his late residence in Little Chelsea. It grows in some abundance on the sides of a ditch along with *Juncus bufonius*, *Bidens cernua*, *Ranunculus sceleratus*, *Polygonum minus*, and other such semi-aquatics. The individual plants here figured and described were gathered by the Rev. Mr. Bree in company with Mr. Haworth, and were sent to me on the 27th of September. Many of the specimens were in flower, but more in seed." I believe that this plant has been regarded as an inhabitant of Britain, owing to a mistake of the Rev. Mr. Bree. It is very true that the plant grew on the side of a stream called Eelbrook, in a common field between the King's Road and Parson's Green, on the Fulham Road; but Mr. Haworth made no secret that he had sowed it there from seed which he obtained from Swiss specimens which he purchased from Mr. Thomas, of Bex, who collected Swiss plants for sale. This explains why it has not been found in any other locality except Godalming, where it was probably also sowed. The plant did not come up every year on the side of the Eelbrook, but appeared in favourable seasons. I believe the field is now drained and built over, or, at least, was rapidly being so used when I was there a few years ago.—J. E. Gray. [In the number of the 'Magazine of Natural History' for March, 1831 (iv. 186), the Rev. W. T. Bree says that "he was directed and accompanied to the spot for the express purpose of gathering specimens of the plant by A. H. Haworth himself," who remarked "that it was somewhat extraordinary the plant should have so long escaped his notice, who had for a number of years resided at Chelsea, and botanized with no little assiduity in its environs." In S. F. Gray's 'Natural Arrangement of British Plants,' ii. 730 (1821), no hint is given of the plant there called *Cyperus Haworthii* having been artificially introduced. Other facts of its history will be found in the 'Flora of Middlesex.'—Henry Trimen.]

ACCENT IN BOTANICAL NAMES.—In the remarks on this subject by Mr. Robert Tucker, he gives two instances in which I "stand alone,"—*Petroselinum* and *Urtica*. It is by a typographical error in each case; in both words the penult is long; and as I have accented by the length of syllables, the accent should be immediately after the *i* in these names. —J. BOSWELL SYME.

SARRACENIA PURPUREA, *L.*—In Provancher's 'Flore Canadienne,' t. i. p. 30, it is stated that this curious plant is often cultivated in gardens in its native country, and that it may be grown in a damp place or in an artificial marsh covered with Sphagnum. The author states, also, that if carefully transplanted in early spring, there is no difficulty in getting it to flower in ordinary garden soil. The attempt to grow it in the open air is rarely made in this country. At the Glasnevin Botanic Gardens, however, a fine plant has flourished for the past five years in a small bog by the side of the lake. Nothing could be more satisfactory than the appearance of the clump of certainly not less than two dozen well-developed pitchers, and this, notwithstanding that in winter it is covered with water often frozen over and skated upon. Dr. Moore had a second plant, but this was stolen by a too unscrupulous admirer. Some years ago the rhizomes were introduced into this country as a proposed remedy for smallpox. Had the plant proved to have been of any value in this respect, it would not have probably been difficult to have grown a sufficient supply of it.—W. T. THISELTON DYER.

ARABIS STRICTA, *Huds.*—In the Supplementary List of Plants for Somersetshire, given on the authority of the late Rev. J. C. Collins, in Mr. H. C. Watson's 'Botanist's Guide,' *Arabis stricta* is mentioned as having been observed at Cheddar and rocks on the Quantoch Hills, near Merridge. Can any correspondent of the 'Journal of Botany' inform me if specimens have been collected from these localities of late years? I may take the present opportunity of stating that I should feel greatly indebted to botanists for any information respecting the more rare and critical plants of the county, having for many seasons past made its flora my especial study.—T. B. FLOWER.

MISTLETOE ON THE OAK.—In addition to the old localities previously cited, I find the following in 'Hortus Collinsonianus' (privately printed by L. W. Dillwyn, 1843):—"On the Oak (which is very rare) Mr. Knowlton has twice seen it. In August, 1765, three plants were found growing on the oak on the estate of —— White, Esq., at Watling, Wells."—J. BRITTEN.

USES OF PHRAGMITES COMMUNIS.—The economic applications of many of our British plants are fast passing into the region of antiquity. Amongst our grasses the common Reed (*Phragmites communis*, Trin.) was one of the most useful to the peasantry in marshy districts. The stems were not only very generally used for thatching, but also for partitions of rooms instead of laths, being plastered over in a similar manner. They were also used in place of boards for building up the sides of sheds and outhouses, and for fences and screens in gardens to protect fruit trees. Though they are still used for these purposes in some parts of the country, the more general adoption of bricks and tiles for rural cottages is fast displacing the use of thatch, and, consequently, the use of the reed. We have been told that the stems of this plant are used for the drones of the Scotch bagpipes as well as for the Northumberland small pipes; but the stems of *Arundo Donax* have usually had the credit of being employed for bagpipes and other wind instruments. Can any one confirm either of these queries?—J. R. JACKSON. [In Germany the common Reed is much used for making matting for protecting hotbeds, etc.; and children make small pipes of the stems.—B. SEEMANN.]

WALKING-STICKS.—Few people, probably, have any idea of the extent of the trade in walking and umbrella sticks. Having recently received from one of the largest makers in London a collection of walking-stick materials for the Museum, I was not a little surprised to find among them such woods as the Carob (*Ceratonia Siliqua*), a *Eucalyptus*, probably *E. globulus*, both from Algeria; Soapberry (*Sapindus saponaria*), and Flowered Ebony (*Brya Ebenus*), both from the West Indies. The following, however, I cannot easily determine. One thick, clumsy-looking stick, labelled "Citheure, from the Haute-Garonne, France," has very much the appearance of a gigantic stalk of the common Burdock (*Arctium Lappa*), and another, labelled "Jerusalem Thistle, imported from Smyrna," appears like an Artichoke or Sunflower stem. Perhaps some reader of the 'Journal of Botany' can say whether the stems of these plants are commonly used for walking-sticks in any part of the countries from whence they are said to have been imported.—J. R. JACKSON.

Reports.

THE LOCAL FIELD-CLUBS OF GREAT BRITAIN.

By JAMES BRITTEN, F.L.S.

VII. THE TYNESIDE NATURALISTS' FIELD CLUB.

This was the second Field Club, in respect of date, established in Britain, and from the scientific value of its printed Transactions, may justly be considered the first in importance. It was founded on the 25th of April, 1846, for the joint purpose of investigating the Natural History and Antiquities of the district. The officers consist of a President, Vice-President, Committee, and Secretary, all of whom are chosen annually. The subscription was fixed at 5*s*. per annum, ladies being admitted as honorary members. The publication of correct lists of the various natural productions of the counties of Northumberland and Durham was among the objects which it was proposed to accomplish; as well as the formation of local collections, illustrative of such lists, which were to be placed in the Newcastle museum. With a view to the more convenient carrying out of these arrangements, a sub-committee was appointed for each branch of natural science. Five field-meetings are held during each year, the first of these having taken place on May 26, 1846. Mr. Ralph Carr and Mr. John Thornhill were respectively President and Secretary during the first year of the Society's existence.

The first volume of the Transactions of the Club was published in 1850, and at once took a high position, from the scientific value of the papers which it contained,—a position which has been ably maintained by the succeeding volumes. It contained a summary of the proceedings during 1846–50, with a catalogue of the insects of Northumberland and Durham, by Messrs. J. Hardy and T. J. Bold; of the mollusca, by Joseph Alder; of the fossils of the Permian system, by Richard Howse; and various shorter papers of equal value and interest. Many insects new to Britain, and even to science, were first published and described in these Transactions, which may be looked upon as the most important contribution made by any Society to the knowledge of the Natural History of Great Britain.

The Club continued in its useful career for many years uninterrupted by any events which require special notice here. Fortunate in having for its officers men of undoubted ability, who were willing to devote themselves in no ordinary degree to the advancement of science, it is not to be wondered at that the Society maintained the advanced position which it had taken up at its commencement. All who have had anything to do with a local body of this description know how important it is that a fitting President and Secretary should be secured; and the names of those who have filled these posts in the Tyneside Club are ample guarantees that nothing further could be desired in these respects.

In 1864 an arrangement was made between the Club and the old-established Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne, by which the then members of the former were recognized as associates of the latter; those who subsequently joined the club paying 5*s.* entrance fee in addition to their subscription. The Transactions of the Club, of which six volumes had appeared, subsequently adopted the title of the 'Natural History Transactions of Northumberland and Durham.' Of this new series three volumes are published, that which most concerns us being the 'Flora of Northumberland and Durham,' by Mr. Baker and Dr. Tate, which has been fully noticed in these pages.* The various catalogues are still in course of publication, the last volume containing a paper on the "Crustacean Fauna of the Salt Marshes," and a "Catalogue of the Aculeate Hymenoptera" of the two counties.

The actual number of members at present enrolled is 557; the President is G. S. Brady, Esq., and the Secretaries, Thomas Thompson and P. Morison, Esqrs. It is much to be desired that the Natural History Societies of our larger towns would take the Tyneside Club as an example of what such bodies ought to be, and would endeavour especially to do a similar service to science by the publication of equally important and useful transactions.

The following are the titles of the botanical papers, exclusive of short notes, which have appeared in the Transactions of the Club:—

Vol. I. "On Extensive Fissures observed in Stems of two living and healthy Trees of Spruce Fir." By Ralph Carr, Esq.

Vol. II. An Enumeration of Plants, Indigenous and Naturalized, occurring within five miles of Newcastle-upon-Tyne." By John Storey, F.B.S.E.

Vol. III. "On the Effects of the Severe Winter of 1854–5 upon Evergreen Vegetation in the North of England." By Ralph Carr.—Abstract, etc., of a Paper entitled "Observations on the Growth in Diameter of Dicotyledonous (Exogenous) Stems." By D. Oliver, jun. With Plate.—

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* 'Journal of Botany,' Vol. VI. p. 286.

"Memoranda of Plants collected by the 'Coquet' in 1856." By D. Oliver, jun.

Vol. IV. "Notices of Remarkable Trees in Northumberland." By the Rev. John F. Bigge, M.A.—"Notes on Plants new to the Flora of Northumberland, with Observations on some Critical Species." By Daniel Oliver, jun., F.L.S.—"Catalogue of the Marine Algæ of Northumberland and Durham." By George S. Bradley. With Plate.—"Remarks on some New Microscopic Algæ." By Tuffen West., F.L.S. With Plate.

Vol. V. "Effects of the Severe Winter of 1860–1 upon Evergreen Vegetation in Northumberland." By Ralph Carr, Esq.—"Notes on the Botany of the South Durham Ballast Hills in the Year 1861." By the Rev. Alfred Merle Norman, M.A.—"Notes on the Species into which the Linnean *Polygonum aviculare* has been divided by Continental Botanists." By the Rev. Alfred Merle Norman, M.A.—"Notes on the Flora of the Old and West Hartlepool Ballast Hills, with a List of the Rarer and more Characteristic Species." By M. A. Lawson, B.A., Trin. Coll., Cambridge.

Vol. VI. "Notes on Plants collected during the Meeting of the British Association, 1863." By J. G. Baker. Contains Notes on the Rubi of the Tyne Province.—"On Proliferous Cones of the Common Larch." By John Hogg, M.A., F.R.S., etc.

New Publications.

Dendrologie. Bäume, Sträucher and Halbsträucher, welche in Mittel- und Nord-Europa in Freien kultivirt werden. Von Karl Koch, Med. et Phil. Dr. Erster Theil. Erlangen. 1869. Pp. 735.

Professor Karl Koch has brought to the publication of this very useful work a good deal more than the industry of the mere compiler. He is well known to have been long occupied with the origin of our cultivated fruit-trees; and no more important inquiry could be suggested to a critical worker, nor one more likely to produce information available for other students besides geographical botanists. For four years the author travelled in western Asia, during which time he was always on the look-out for any plants which could be identified with the wild originals of cultivated forms. A short paper read before the British Association gave a *résumé* of his principal results, and concluded with a promise which the publication of the present volume has in part fulfilled. We have so far the whole of the cultivated arborescent *Polypetalæ*, which are able to adapt themselves to the climate of North and Mid-Europe. To what extent the unhappy distractions which have produced lamentable hiatuses in so many fields of scientific research will postpone the publication of fresh instalments, must be a matter of uncertainty; but it is to be hoped that we shall not have to wait long for the conclusion of a work which will be the standard authority in its subject.

It will be interesting to give Dr. Koch's opinions upon a few points. Of the Pear section of the genus *Pyrus*, six species are enumerated:—

1. *Pyrus Achras*, Gærtn. (the name *P. communis*, L., is passed over on account of its including cultivated forms). Wild in China.

2. *P. nivalis*, Jacq., includes *P. salviæfolia*, De Cand. S. Europe.
3. *P. elæagnifolia* (nec *elæagnifolia*, De Cand.), Pall. = *P. amygdaliformis*, Vill. Caucasus, Armenia.
4. *P. salicifolia*, L. f. East.
5. *P. Persica*, Pers. Syria, Arabia, Persia.
6. *P. Auricularia*, Knoop. = *P. Pollveria*, L. Hybrid between *P. communis* and *Sorbus Aria*.

P. Achras is considered to be the stock of most of our Pears, though *P. elæagnifolia* and *Persica* by cultivation and accidental crossing have also given rise to varieties. M. Decaisne, however, believes that all have sprung from one stock. Of Apples, *P. pumila*, Mill., the celebrated Paradise stock, is stated to be wild in S.E. Russia, Caucasus, and Tartary, *P. dasyphylla*, Borkh. = *β. tomentosa*, Koch, only in the East, and *P. sylvestris*, Mill. = *Malus acerba*, Merat., in S. Siberia and N. China, but not in Europe.

Besides *Prunus avium*, cultivated Cherries are represented by *P. Cerasus*, L., probably spontaneous in Asia Minor (the city of Cerasus having taken its name from the Cherry, and not the Cherry from it), and *P. acida*, Dumort., the native country of which is not known.

The Almond and Peach are separated under the Linnæan species of *Amygdalus communis* and *A. Persica*, although there is ground for believing, with Mr. Darwin, that the Peach is derived from the Almond.* The original country of either is unknown, though Mid-Asia is suggested for the Almond, and Persia for the Peach. De Candolle, however, believes, on etymological grounds, that it came originally from China.

W. T. T. D.

Reports of Experiments on the Influence of various Manures made in the Horticultural Society's Gardens, Chiswick, in 1869. By Dr. M. T. Masters, F.R.S., and Dr. J. H. Gilbert, F.R.S. London. 1870. (From the Proceedings of the Royal Horticultural Society.)

For these important experiments twelve species of plants were selected as typical of meadow herbage, and upon these the action of particular manures was tried. The plants included six Grasses, three Clovers, and three pasture weeds. Some defects of the experiments, unavoidable in a first series, are easily seen. The boxes, apparently of four superficial feet and eighteen inches deep, though seventy-two in number, did not include a single duplicate of any one of the experiments, and the results consequently lacked a most important element of control. The value of thousands of farm experiments of a similar kind, but on a larger scale, is sadly lessened, owing to the same radical defect; and on the farm the variations in the plots as to soil, etc., are, of course, much more serious sources of error than any likely to exist in the Chiswick trials. Still we hope, in spite of the increase of trouble involved by doubling the number of boxes, that a duplicate of each experiment will be arranged. If it had not been desirable to make the Chiswick series a continuation and aid to the Rothamsted series, we should have counselled simpler manures and a smaller number of distinct plots, omitting, say 3 and 5, out of the subjoined series :—

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* 'Animals and Plants under Domestication,' i. 337.

1. Unmanured.
2. Mineral manure.
3. Ammonia salts.
4. Nitrate of soda.
5. Ammonia salts and mineral manure.
6. Nitrate of soda and mineral manures.

The mineral manure consisted of the sulphates of potash and magnesia, carbonate and phosphate of lime, and chloride of sodium. The mixture was applied at the rate of 3950 lb. per acre, a quantity which corresponded to less than six ounces per box. For box 3 a mixture of sulphate and chloride of ammonium, at the rate of 800 lb. per acre, was used, and for box 4, 1100 lb. of nitrate of soda. For box 5 the manures for 2 and 3 were joined, and for box 6 those for 2 and 4. The manures were intimately mixed with the whole of the soil in the boxes. The twelve kinds of seed were sown in the several-prepared soils on April 1, 1869.

In spite of the great care and pains bestowed on these experiments, and the constant attention which they received during the season of growth, several circumstances are acknowledged to have impaired their value. The soil was too rich, while the seeds were not in all cases free from admixture, and were too thickly sown. Yet, after all, some very interesting results have been obtained, valuable for comparison with past experiments, and indicating the proper method to be pursued in further inquiries. We are bound to say that many of the commonly-neglected conditions of agricultural experiments, such as temperature, rainfall, with the proportion of stem to root, etc., were duly recorded in the Chiswick series.

We now proceed to give a very brief outline of the chief results obtained, premising, however, that a clear conception of the whole conditions and bearing of the experiments can be gathered only from the study of the original report.

1. In the unmanured boxes, nine out of the twelve species experimented with showed the minimum degree of vigour. The exceptions were in the cases of *Anthoxanthum odoratum*, *Lotus corniculatus*, and *Achillea Millefolium*. The deficiency of rain had generally less injurious effect upon the plants in the unmanured boxes than in those which had been artificially stimulated to increased growth, especially by nitrogenous applications.

2. The boxes supplied with mineral manures exhibited poor results in the case of five Grasses out of six, the exception being the box of *Poa annua*. But two of the three Clovers, *Trifolium pratense* and *T. repens*, attained a high development, the third plant, *Lotus corniculatus*, being here an exception.

3. Ammonia salts benefited considerably all the Grasses save the *Anthoxanthum* and *Lolium*. The two species of *Trifolium* showed but a low degree of vigour, but the *Lotus* attained a medium degree of development.

4. Nitrate of soda exercised less influence upon the species of *Poa* than upon the other Grasses, which latter mostly attained to a greater degree of development than in the preceding series with ammonia salts. The nitrate of soda proved of little use to the Clovers.

5. When mineral manures and ammonia salts were used together, they

exercised a generally favourable influence upon the Grasses up to the time of cutting, but the plants declined in vigour afterwards. In the White Clover and *Lotus* the development was uniformly high, but in the *T. pratense* there was a decline in October.

6. When mineral manures and nitrate of soda were employed together, the effects were generally similar to those in the preceding series (5). This mixture did little to stimulate the growth of one of the plants experimented upon, the *Plantago lanceolata*, which did not attain much luxuriance when dressed with nitrogenous manures.

The above results constitute but a small part of one set of observations in the Report of Drs. Masters and Gilbert. Another set relates to the condition of the plants in the middle of October; another to the state of the roots of the various plants in the following April (1870); while another set gives the contrasts observable between the growth of the root and herbage in the seventy-two experiments. Two admirable features of the Report cannot, however, be left unnoticed, even in the meagre outline which we have attempted to draw. We refer to the analytical tables on pp. 64 to 67, and to the diagrammatic representations of the fluctuations in the growth, etc. of the various plants. These conclude the Report. The analytical work was performed in the Rothamsted Laboratory with appliances and with a care which scarcely anywhere else in England could have been obtained. It includes the total weights of dry vegetable substance produced in each box, the total weights of the plant ashes from each experiment, and the percentage proportions of ash to dry vegetable substance.

We quote, as indicating some of the valuable bearings of such inquiries as the present, the concluding paragraph of Dr. Gilbert's remarks:—

"If the results of the first season's experiments do not, as hardly could be expected that they would, afford very satisfactory evidence in regard to the many points of interest which experiments of the kind are calculated to elucidate, at any rate much experience has been gained as to the conduct of future trials; and the discussion of the results themselves cannot fail to indicate how much we may hope to learn when the unfavourable conditions have been avoided, favourable ones carefully secured, and the results attentively studied. The relatively varying dependence of different plants on soil and atmospheric conditions respectively, the effects of varying conditions as to soil-supply, the tendency to luxuriance on the one hand or to maturation on the other, or the widely varying special characters of development, according to the external conditions provided, are points which, when thoroughly investigated and generally understood, must serve to place the cultivation of plants for various purposes—whether for the supply of wood, of fibre, of food, of drug or colour in some special organ, of fruits or of flowers—on the sure basis of scientific principle, rather than leave it dependent on the still uncertain, though often wonderfully successful, guidance of empiricism. May not such knowledge, too, give much insight into the varying functions of plants which have been held to be allied to, or separated from, each other, as the case may be, for reasons quite independent of the sources of their accumulation, or the special tendency of their assimilative actions?"

A. H. C.

Proceedings of Societies.

LINNEAN SOCIETY.—*February 16th.*—G. Busk, Esq., Vice-President, in the chair. The following papers were read:—"On the Reproductive Organs of Tremellineous Fungi," by L. and C. Tulasne; "Bryological Remarks," by S. O. Lindberg.

March 2nd.—G. Bentham, Esq., in the chair. The following botanical paper was read:—"On the Familiar Names of Plants," by the Rev. S. Mateer.

March 16th.—G. Bentham, Esq., in the chair. Professor Oliver exhibited specimens of *Cupania cinerea*, Pöpp., showing the singular dehiscence of the seed, which allows the embryo to fall out, whilst the testa and arillas remain on the tree. Dr. Hooker read extracts from a letter from General Munro, describing the vegetation of a part of St. Vincent, West Indies. Mr. Henry Reeks showed a series of forms, which he considered a complete gradation between *Polystichum aculeatum* and *P. angulare*. The specimens were collected at Woodhay, Hampshire. The following paper was read, "Notes on *Capparis galeata* and *G. Murrayi*," by N. A. Dalzell.

April 6th.—G. Bentham, Esq., in the chair. The following paper was read:—"On the Styles and Stigmas of *Proteaceæ*," by the President. The pollen in this Order is usually scattered before the flower opens; the stigma is also exposed, though not mature, in the bud. From the examination of mainly dried specimens, it appears that there are arrangements in many genera to prevent self-fertilization. In *Petrophila*, the stigmatic surface is shielded in the bud by the perianth-segment; in a section of *Persoonia*, the style is turned away from the stamens, and received into a pouch; whilst in *Conospermum*, the lowest, and in *Synaphea*, the uppermost of the four anthers is abortive, the cells being open cups, and in each case the stigma is directed towards the abortive anther.

BOTANICAL SOCIETY OF EDINBURGH.—*April 13th.*—Alexander Buchan, Esq., President, in the chair. The following communications were read:—"Notes on the recent Progress of Botany in Denmark." By Dr. Robert Brown. In this paper Dr. Brown gives a review of some of the more important researches made by Danish botanists during the last few years, and published chiefly in the Danish language, in the Transactions of the Natural History Society, the Botanical Society, the Academy of Sciences, or as separate works. After noticing the proposed removal of the Botanic Garden from the centre of the city of Copenhagen, where it has long been, he called attention to the foundation of the *Botanisk Forening*, or Botanical Society, which now numbers between one and two hundred honorary, resident, non-resident and foreign members, and publishes a yearly 'Tidsskrift,' or fasciculus of transactions, containing many papers of merit. The last part is occupied by Branth and Rostrup's "Lichenes Daniæ.' It is under the Presidency of Professor Lange, and is yearly increasing in importance and numbers. The publication of the 47th livraison of the 'Flora Danica,' under the editorship of Professor Lange, marks an era in Danish botany, and keeps up the high reputation this work has attained. The present part contains, like its predecessors, 60 plates, representing 75 plants (14 of these being varieties already partially described in the 'Flora Danica' and two hybrids), of which 24 have not been figured previously in any iconographic work. The plates are executed by Mr. Thornman. Perhaps next to the 'Flora Danica' the most important botanical work produced in Denmark of late is 'L'Amérique Centrale' of Professor A. S. Oersted, the results of journey in Costa Rica and Nicaragua in 1846–48. As yet only the first part is issued, partly at the expense of the Danish Academy of Sciences. It contains 18 folio pages of letterpress descriptive of the physical features of the country, a map, two physiognomical views, and 18 magnificent plates in copper, representing new species of plants. (Reviewed in Journ. of Bot. 1865, p. 162.) Oersted has also published an elaborate memoir on the classification of the Oaks, founded on the form of the pistil, venation of leaves, etc., which differs materially from that of De Candolle and other preceding writers, and is a valuable contribution to the history of the *Cupuliferæ*. To the 'Proceedings of the Academy of Sciences' the same author has also contributed a paper on the "Silphion" of the ancients, which, from a study of the classical writers, Greek coins, and vases, he considers was a species of plant allied to *Narthex Asa-fœtida*, and which he proposes to call *Narthex Silphium*. Professor Oersted's numerous papers on the development of Fungi, his recently published 'Introduction to the Study of Cellular Plants,' his 'Memoir on the Morphology of the Coniferæ,' etc., were also noticed. Of late years Dr. Eugene Warming has visited Brazil, and made collections of plants chiefly in the vicinity of Lagoa Santa. These are now in course of description by himself and other botanists, chiefly Augustus Progel, J. A. Schmidt, Johannes Müller (Argoviensis), Otto Bockler, C. F. Meissner, A. W. Eichler, J. G. Baker, Ernst Hampe, George v. Martens, and Otto Nordstedt. The memoirs of these botanists are published chiefly in the 'Natural History Society's Transactions,' are written in Latin, and contain descriptions and critical and geographical notes of many new or little known species. Warming has published in the same place remarks on the development of heat in *Philodendron Lundii* (n. sp.) from Brazil. The development of heat during the flowering period embraces two calorific undulations. The first day the greatest temperature is towards 6 to half-past 7 o'clock P.M. It then abates and falls to the normal heat during the night. The next day the calorific movement attains its culminating-point, 8 to 10 A.M., and ceases towards noon. These observations are made on a plant which flowered from the 16th to 17th of November, 1864. The culminating-points of the calorific undulation do not coincide with the time when the temperature of the air is at its maximum (viz. 2.30 P.M.). However, there has been observed a certain dependence between them of this kind, that when the temperature of the spadix was more or less high, so also was the temperature of the air. The first period of heat presented the greatest intensity. Not only did the temperature last a much longer time, but was more elevated than in the second period. The greatest heat which Dr. Warming has observed was 39½° C., the temperature of the air being then 23¾°, showing a difference of 15¾°. The difference in the part occupied by the stamens was even higher, viz. 18½°. The anthers did not open or discharge their pollen until the evening of the second day, after which the calorific movement ceased. At the time of the development of heat the inflorescence gave forth an aromatic odour, which was much stronger when the temperature was more elevated. The spadix is constantly surrounded by swarms of insects, which certainly assist the fructification. Among the other researches noticed were Oersted's paper on *Bidens platycepha*; Warming, on the spiral arrangement of the leaves of *Cucurbitaceæ*, and on *Scopiola atropoides* and other *Solanaceæ*; Lange's addition to his 'Handbook of the Danish Flora,' Didrichsen's 'History of Danish Botany,' and Warming's 'Inaugural Thesis on the Inflorescence or Development of *Euphorbia*.' The review concluded with some account of recent Danish excursions to Iceland and Greenland, and the results derived therefrom.—"On the Phyllotaxis of *Lepidodendron*." By Prof. Alexander Dickson. (This will be printed *in extenso* next month.)—"On *Lilium canadense*, L., var. *puberulum*, Torr. By Dr. Robert Brown. In the enumeration of Dr. Bigelow's Californian collections in the fourth volume of the 'Pacific Railroad Surveys' (Bot. p. 146), Professor Torrey notes a variety of *Lilium canadense*, distinguished by its stem and peduncles being minutely pubescent, the leaves broadly lanceolate, with the margin and nerves puberulous, the flowers (2–7) largely pedunculated, the sepals markedly reflexed and purple-spotted within. In the course of examining his own and the late Mr. Jeffrey's collection, Dr. Brown had found specimens which corresponded to Torrey's description, but the characters are by no means constant, nor are all found on one plant. In specimens of *Lilium canadense*, gathered in Canada, the leaves were found quite as broad as any from North-West America, and in numerous specimens of *Lilium canadense* from Oregon, California, and British Columbia, the leaves were almost linear-lanceolate. The pubescence is not a constant character; for while it was found on young plants, it was absent from old, nor was constant in either; most probably it is caducous. The result of this is, that in all likelihood there is only one form of *Lilium canadense* found over the whole North American continent from the Atlantic to the Pacific, and that any varieties are merely local, and the result of habitat, age or other circumstances, which do not give the characters derived therefrom any kind of specific value.—"Report on the Open Air Vegetation at the Royal Botanical Garden." By Mr. M'Nab.

LITERARY AND PHILOSOPHICAL SOCIETY OF MANCHESTER.—*Feb. 27th*, 1871.—Joseph Baxendale, Esq., President of the Section, in the chair. "Notes on *Polygonum minus* and its allies," by G. E. Hunt. In reference to the discussion at this Society in November last (see p. 30), as to the claims of *Polygonum mite*, Schrank, to rank as a native of Cheshire, in support of which it was stated that "so long ago as 1828, Mr. W. Wilson, of Warrington, sent the plant from a Cheshire locality under the erroneous name of *P. minus* to the late Sir W. J. Hooker, in whose herbarium at Kew the specimens still are,"—Mr. Hunt stated that, through the kindness of Mr. Baker, of Kew, he had been since furnished with the perianths and fruit of the original specimen referred to above, and had compared them carefully with *P. minus* and *mite* from various stations both in Britain and from the Continent. The comparison quite satisfied him that the Kew specimen from Cheshire could not be associated with *P. mite*, but was correctly referred by Mr. Wilson to *P. minus*, Huds. Specimens were sent to Mr. Baker for his opinion, and his reply was as follows, in a letter dated 31st January, 1871:—"I believe, now that I have laid the nuts side by side, and compared them carefully, that you are quite right about the *Polygonum*." I may further add that all the specimens also of more recent collection from Lancashire and Cheshire seen by me belong to *P. minus*, Huds. The distinctive characters and synonymy of the species were then given. Mr. Hardy remarked that it would appear from Mr. Hunt's remarks that, besides Mr. Baker, two at least of our oldest and most able botanists had failed to differentiate *P. minus* and *P. mite* when specimens were before them. In support of what was stated at the previous meeting of the Society, as quoted by Mr. Hunt, he read the following extract from an article in the 'Phytologist' (vol. ii. p. 332), by Mr. H. C. Watson, "On the *Polygonum mite* of Schrank and allied species":—"Cheshire specimens (of *P. mite*) are in the herbarium of Sir W. J. Hooker, sent by Mr. William Wilson, under the name of *P. minus* (1828); I have also European specimens of the same species, sent with the names of *laxiflorum*, Weihe, *dubium*, Braun, *Braunii*, Bluff and Fing., and *mite*, Persoon. Mr. Hardy declined assent to Mr. Hunt's dictum that the relative size of the nut furnished the only good character by which to separate the two plants, believing that the size of the flower and the habit of growth, when occurring side by side, as these specimens did, ought not to be passed over; the leaves, too, of the Mere Mere specimen in particular were actually more broadly lanceolate than those of the Oxford and Surrey specimens traced by Mr. Hunt; and both the nuts and flowers larger than any of the other selected *P. minus* exhibited by Mr. Hunt, and doubtless correctly named. The presence or absence of glands was, he believed, an important character; but it was requisite, for the observation of these, that the specimens should be freshly gathered. Mr. Hunt's localities for *P. mite* in Britain are all southern, but Mr. Baker, in his 'North Yorkshire,' gives no less than four localities for it, two in the immediate neighbourhood of the city of York, and one as far north as Thirsk. Mr. Hardly also referred incidentally to the notes by the Hon. J. Warren in this Journal (pp. 8, 9) on the Mere Mere *P. nodosum*, and the Cheshire *Epilobium obscurum*, and stated that he believed the former to be the seedling form of *P. amphibium* (*terrestre*)* and the latter identical with the plants published by Mr. Baker in his 'Plantæ Criticæ,' and North Warwickshire Fasciculus, under the name of *E. ligulatum*.

Botanical News.

The death is announced, on the 3rd of April, of William Wilson, of Warrington, at the age of seventy-two. He was apprenticed to a solicitor at Manchester, and for a few years practised his profession at Warrington, after which he devoted himself to science. In 1826, he made the acquaintance of Sir J. E. Smith and Professor Henslow, and by them was introduced to Dr. W. J. Hooker, with whose class, he, in 1827, made his first botanical excursion. He greatly helped both Smith and Hooker in their 'British Floras,' and soon took a high place amongst botanists. From about 1830, he specially studied Mosses, and the 'Bryologia Britannica,' which he published in 1855, is still the text-book of English students of that group of plants. A new edition is much wanted, as about a hundred new British species have been detected since its publication, and this want Mr. Wilson had hoped to have supplied, but his declining health compelled him, shortly before his death, to desire his publishers to secure another editor. Besides this, Mr. Wilson described the Mosses for Dr. J. D. Hooker's 'Flora Antarctica,' Seemann's 'Botany of the Voyage of H.M.S. Herald,' and Drummond's 'American Musci;' he also published many new exotic species in Hooker's 'London Journal of Botany.' His name is commemorated in *Rosa Wilsoni*, Borrer; *Hymenophyllum Wilsoni*, Hook., and other British plants. His daughter placed on his coffin a wreath of Hypnums, Violets, and Ferns, a tribute of affection from a fellow-muscologist—Mr. G. E. Hunt.

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* Not so. Mr. Warren's plant is a prostrate form of either, as named, *P. maculatum* (*nodosum*, Auct.), or possibly *P. Persicaria*. The perianths bear a few glands.—H. Trimen.

Mr. Robinson writes from Paris, after the first siege of the city:—"The poor old Jardin des Plantes looked as straight-laced and as well raked as on any previous 20th of March. The ruin caused by the shells has been quite repaired, and nothing is wanting but plants, which, no doubt, will soon be replaced by the other public gardens of Europe. By the way, it would have been a great gain to gardening if the old place had been utterly destroyed. Then, perhaps, a scientific garden, worthy of Paris in design as well as in contents, might some day be the result. It is, perhaps, the worst example of the numerous public gardens that are laid out in direct violation of the most essential and evident principles of garden design." Perhaps the doubtful gain Mr. Robinson longs for may still be attained.

On May 1st, will be published the first part, to be continued quarterly, of Mr. Worthington Smith's 'Mycological Illustrations,' edited by Mr. W. W. Saunders and Mr. A. W. Bennett. It will contain 24 plates, and the price is 10*s*. 6*d*.

Dr. Robert Brown, of Campster, has described in the 'Annals and Magazine of Natural History' for April, three new species of *Quercus* from north-west America.

The Leeds Philosophical Society have secured Mr. L. C. Miall, of Bradford, a good botanist, as Curator of their excellent museum.

We are sorry to see that Mr. Twining's economic museum at Twickenham has been destroyed by fire.

The attention of our readers is called to the well-written and illustrated papers on "Botany for Beginners," in the 'Gardeners' Chronicle,' which may be recommended, we think, with confidence to any one wishing to commence the study.

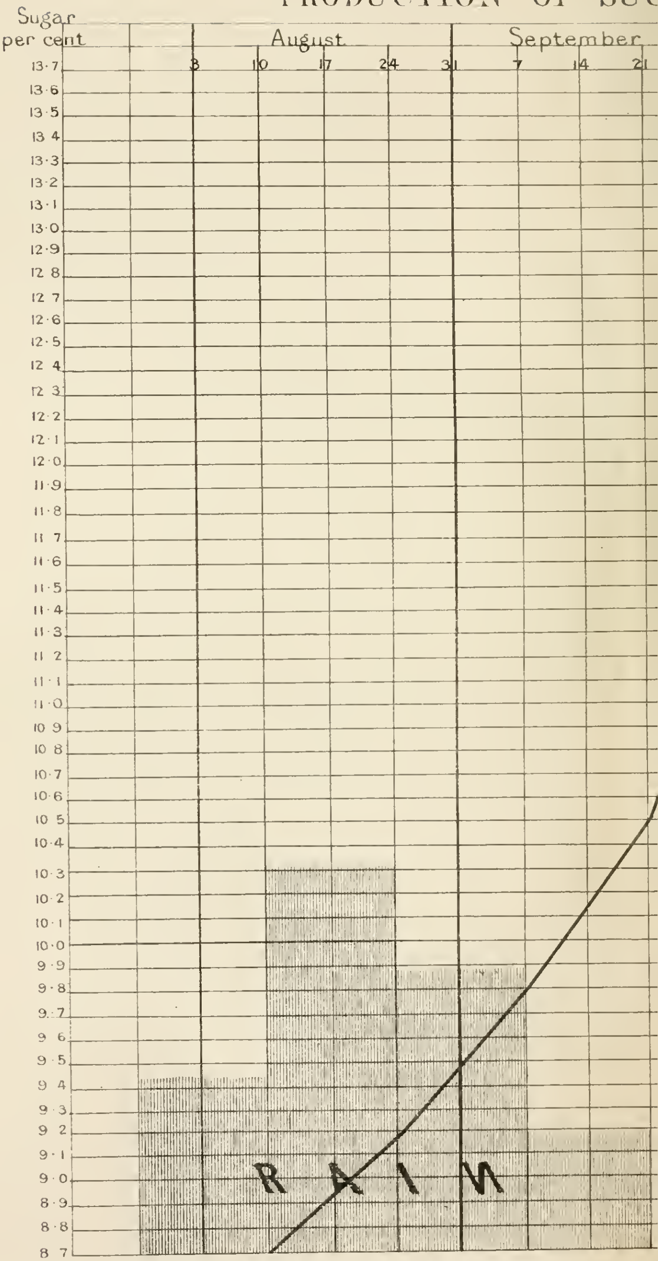
The Report of the Botanical Exchange Club is printed, and will be very soon issued to members.

The Winchester and Hampshire Scientific and Literary Society, which in March 1870 formed a botanical section, is to be congratulated on that step. Under the Hon. Secretary's (Mr. F. J. Warner) energetic superintendence, the section held seven meetings last year, and made three excursions. The same gentleman, with the assistance of two other botanists, has prepared a list of species in the immediate neighbourhood of Winchester, which is to be published in a future Report. Surely there is hope now of a Flora of Hampshire.

COMMUNICATIONS have been received from F. Stratton, J. Britten, Rev. T. Allin, J. Sadler, J. Bagnal, Professor M'Nab, W. R. Jackson, Rev. F. E. Kitchener, Professor Thiselton Dyer, etc.

CORRIGENDA on p. 94, l. 22 from bottom, *for* "2 cones" *read* 1 cone; l. 16, *for* "right" *read* left; l. 15, *for* "left" *read* right; l. 3, *for* "$\frac{8}{21 \times 3}(=\frac{8}{13})$" *read* $\frac{5}{13 \times 3}(=\frac{5}{39})$.

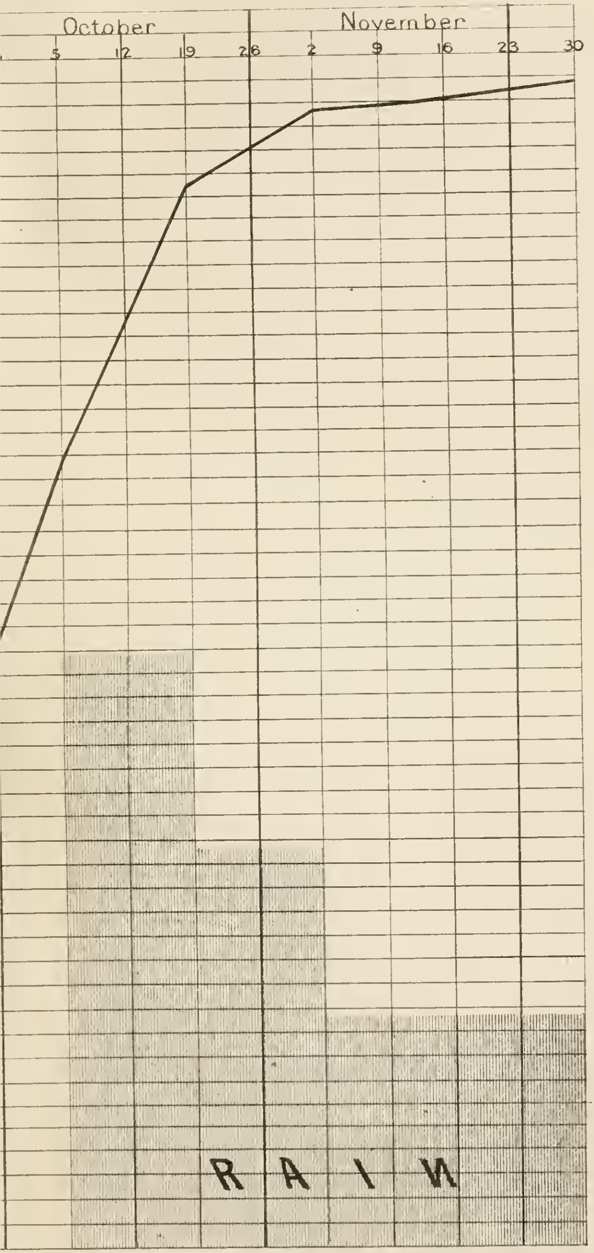
PRODUCTION OF SUG



Mintern Bros lith

Tab. 117.

IN BEET-ROOT, 1870.



Original Articles.

SUGAR IN BEET-ROOT.

By A. H. Church, M.A., F.C.S.,

Professor of Chemistry, Royal Agricultural College.

(Plate CXVII.)

Climate, season, soil, and manure, all have an influence on the amount of sugar produced in the root of the sugar-beet. On one occasion seed saved from good Silesian sugar-beet, containing, on an average, about 13 per cent. of sugar, yielded plants the roots of which did not furnish more than one-fourth this percentage, for they had been too heavily dressed with farmyard manure. In wet seasons, also, the roots may become very large, but the quantity of sugar they contain will not only be proportionately or relatively less, but may even be absolutely smaller in amount per root. Should, on the other hand, the season prove unusually dry and hot, a premature development, in the first year, of the flowering stem may take place, and this will be attended with a loss of sugar amounting to from one-eighth to one-fourth of the whole quantity present in the root. Yet, from the experiments of Corenwinder (Jahresbericht Agric. Chem. 1867, p. 127) the normal flowering of this biennial plant is attended by a complete consumption of its whole store of sugar. It is a singular fact that the seed produced in the first year from a sugar-beet plant of a good strain yields roots which only contain from 2·75 to 6·23 per cent. of sugar, according to the experiments of the chemist just named. Many other facts of physiological as well as agricultural interest relating to the occurrence and disappearance of sugar in this root have been recorded. It is, for instance, well known that in such beets as grow partly out of the ground the percentage of sugar in the exposed portion may be only one-third (3·7 per cent.) of that contained (11·2 per cent.) in the covered portion. Even in roots which have no tendency to leave the soil (a quality as valuable as the hereditary sugar-producing character), upper horizontal sections of a root contain rather less sugar than lower sections. Any variations which may exist in the saccharine richness of the several vertical zones of the root, reckoning from its axis to its circumference, do not appear to have been studied.

In the present notice I merely intend to record a series of experiments on the gradual development of sugar in beet-roots during the summer and autumn of the years 1869 and 1870. And I purpose, in giving the more complete experiments of the latter year, to exhibit them especially in relation to the amount of rainfall.

The first series of experiments was made in 1869 with Silesian sugar-beet seed, kindly furnished me by Mr. James Duncan, of Mincing Lane, who has successfully established a beet-sugar factory, at Lavenham, in Suffolk. Roots taken up from the same experimental ground at Cirencester at the undermentioned dates gave the following percentages :—

September 8th, 1869 .	5·85	per cent. sugar.
October 9th, ,, .	8·58	,, ,,
November 3rd, ,, .	9·43	,, ,,
,, 24th, ,, .	10·59	,, ,,

But this series of sugar-estimations was too imperfect to admit of satisfactory conclusions being drawn from it. So, in 1870, another and far more complete series of observations was made. The soil was analysed and the rainfall and temperature regularly recorded, while the determinations of sugar, commenced in August, were continued at fortnightly intervals, until December. The weight of the plants taken up for analysis at each successive period, was also noted, with the proportion of root to leaf which they showed. I do not propose to give here all these details of the experiments, but to confine my remarks to the main conditions affecting the production of sugar in the root.

The table prefixed to this note (Plate CXVII.) represents the rainfall during, and the percentage of sugar after, a series of fortnightly periods. Before making a few remarks on the "sugar-curve," I present, in the annexed table, some of the chief data of the experiments :—

Sugar in Beet-root, 1870.

Periods.	Rainfall.	Ratio of Root to Leaf.	Sugar percentage.	Fortnightly increment of sugar.
I. July 28 to Aug. 9.	·743 in.	100 : 153	8·70	—
II. Aug. 10 to „ 23.	1·630 „	100 : 126	9·20	·50
III. „ 24 to Sept. 6.	1·180 „	100 : 102	9·77	·57
IV. Sept. 7 to „ 20.	·485 „	100 : 91	10·48	·71
V. „ 21 to Oct. 4.	— „	100 : 85	12·00	1·52
VI. Oct. 5 to „ 18.	2·494 „	100 : 65	13·18	1·18
VII. „ 19 to Nov. 1.	1·663 „	100 : 65	13·47	·29
VIII. Nov. 2 to „ 15.	·210 „	100 : 58	13·53	·06
IX. „ 16 to „ 29.	1·723 „	100 : 52	13·58	·05

It should be added that the average weight of the roots increased regularly and to a considerable extent at first, in periods I., II., and III.; afterwards, the increase was less regular. The temperature of the season had attained its maximum three weeks before Aug. 9th, and after that date decreased pretty steadily.

The most obvious conclusions to be drawn from the above table are the following :—

1. During root-development in August, and down to September 20th, the leaves do not proportionately increase, but present a relative diminution of about one-third.

2. During the period referred to above, in I., the absolute quantity of sugar increases considerably, but, owing to the great increase in the absolute weight of the roots, its percentage proportion is only raised by about one-fifth of its percentage at the beginning of this period.

3. During October, the most rapid development of sugar takes place, the virtual maximum of the season being reached at the end of that month.

4. The fortnight without rain, ending Oct. 4th, was that in which the greatest increment in the percentage of sugar occurred (and, it may be added from other data, only an insignificant addition to the weight of the roots was made).

It is intended to continue these experiments, and to render them as complete as possible. It is hoped that important facts in the physiological chemistry of sugar may thus ultimately be learnt.

IS *ACORUS CALAMUS* A NATIVE?

By Henry Trimen, M.B., F.L.S.

The late Dr. Bromfield, in his catalogue of Hampshire plants, thus writes (Phytol. iii. p. 1009),—"I have a lurking suspicion that the Sweet Flag may not be aboriginal to Britain;" and he gives as a reason for this doubt the absence of any record of the plant as wild in the herbals of Turner, Gerarde, and Parkinson. I am informed by Mr. Hemsley that Mr. Borrer also considered it "probably planted" in the county of Sussex, where, as well as in Hampshire, it is confined to a single station.* In the Thames valley, however, the *Acorus* holds a far more prominent place, and is common by the side both of the main stream and of its tributaries as well as round ponds; in the eastern counties it is stated to be equally or more common. Its area is pretty wide, extending from the south coast to Lancashire and York. In the neighbourhood of London it is thoroughly wild, and this is doubtless the case elsewhere in England, for, with the exception of Dr. Bromfield above quoted, all the writers on our flora have deemed it a native. Watson says (Cyb. Brit. iii. 31) "apparently a true native," and (Compend. 348) "native"; Babington and Hooker pass it without a doubt; Bentham says ('Handbook,' ed. 2. p. 436) "believed to be indigenous only in some of the eastern counties of England"; and A. de Candolle does not include it in his list of species certainly or probably naturalized in Great Britain (Geog. Bot. 645–697).

My attention has been lately directed to the matter by reading M. Devos's notes on the naturalized and introduced plants of Belgium in the Bull. Soc. Bot. Belg. 1870, pp. 5–122, where, after a review of the history of the plant on the Continent, he points out that in Belgium, as in all western Europe, the *Acorus*, though now very well and widely established, was unknown before nearly the end of the sixteenth century. He therefore classes it with the "denizens," using that term as Mr. H. C. Watson has employed it. With the view of seeing whether any and what countenance the history of the plant in Britain gives to this view, I have looked over the botanical literature of our country, and I may say at once that the general result is a corroboration of M. Devos's inferences.

M. A. de Candolle classes the data upon which conclusions with regard to naturalization must be based, in the absence of positive proofs, under the three groups of historical, linguistic, and botanical. I will in the case before me take them in that order.

William Turner, in his first book, the 'Libellus novus' of 1538, followed Brunfels in making *Acorus* (of the ancients) to be *Iris Pseudacorus*. He soon discovered his error, and in the names of plants (1548) says, that "*Acorus* groweth not in England." He knew no more of it than the root, then largely sold as a drug, which he describes in his 'Herball,' pt. 1. B. ii. (ed. 1, 1551), and p. 21 (ed. 2, 1568). Lobel, however, in 1575, was able to examine a living plant in the garden of "Johannes Dilsius," at Liége, which had been sent by Clusius, who obtained it from Bithynia ('Observationes,' p. 20). The plant seen by Lobel had no flowers, but he has very well described the root and leaves. This botanist was much in England, and paid special attention to the aquatic plants about London. When Clusius, in 1583, published his 'History of Pannonic Plants,' which also contains his few notes on English Botany, he added to the stock of knowledge about *Acorus* by figuring the inflorescence, giving details of the Bithynian locality at "Prusa" (Brussa?), and informing us (p. 261) that Frisius saw it, in 1577, near Vilna, abundantly, where the inhabitants call it Tartarsky, because its properties were first made known to them by the Tartars.* It soon began to get known in gardens. In 1586, Robin grew it in the Royal Gardens at Paris (Hist. Gen. Lugd. p. 1618), and in 1596 we find it enumerated in the catalogue (p. 1) of Gerarde's garden in London. Here we are told ('Herball,' p. 56) it prospered "exceedingly well," but never bore catkins. Gerarde obviously had no notion that it was a native of this country; he merely repeats the previously-reported exotic localities. Johnson, in his revised edition of Gerarde's 'Herball,' gives a better figure (Clusius's), and says that, in 1632, he received from "Mr. Thomas Glynn, of Glynnllivon, in Carnarvonshire, . . . the pretty Julus, or floure of this plant, which I could never see here about London, though it groweth with us in many gardens, and that in great plenty" (p. 63). Johnson apparently looked upon it as entirely a garden plant, and says (p. 64) it may be "fitly called in English the Sweet Garden Flag;" whilst his contemporary, Parkinson, a very accurate botanist, says explicitly that it is a stranger, "not growing with us" (Theat. Bot. p. 40). *Acorus* is not included in Ray's 'Catalogue of Cambridge Plants' (1660); but in Merrett's 'Pinax,' first printed in 1666, it is entered as "found by Dr. Brown, near Lyn, and by Mr. Brown, of Oxford, near Hedley, in Surry" (p. 2). These localities are also given in the first edition of Ray's 'Catalogus Plant. Angliæ' (1670), where the author adds that he had seen it ten years before near Norwich, and that Mr. Needham reported it abundant and wild in Cheshire (p. 7).

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* Mr. Hemsley has since observed it in a second one, in Arundel Park, where he thinks, it may have been planted.

It appears, then, as far as history goes, that *Acorus Calamus* was unknown in this country before 1596, when Gerarde had it in his garden, and that it was not till about 1660 that it was reported as a wild plant from Norfolk. We have therefore to consider whether it is more probable that, being a common garden plant, it should have become naturalized, or that it was overlooked in the wild state by all the herbalists who botanized in England before 1660. But a few other data may be brought to bear on the question. The plant possesses no English name of any antiquity, the name proposed by Johnson given above being the only one ever used and is indeed that still employed, omitting the word "garden." I have not, however, been able to ascertain whether there is any *bonâ-fide* Welsh name. On the other hand, the aspect of the species, when seen growing round the ponds and by the streams of the Thames valley, is quite that of a native, and gives one no reason to doubt its spontaneity; it has all the look of an integral part of the native vegetation. In the case of a water-loving species, however, too much stress must not be laid upon this fact—*Impatiens fulva*, which grows along with it, has an equally English appearance, though a *certainly* introduced plant of a recent date. Dr. Hooker states, in his 'Student's Flora,' that he has not seen the fruit of *Acorus*, and I am myself in a similar case, but I have not made a special search. Dr. Boswell-Syme describes it in 'English Botany,' but does not say if from British specimens.

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* Pallas, on the ticket to the specimens in his herbarium now in the British Museum, gives some information about the preparation of the rhizome, and its extensive use in diarrhœa, in the regions near the Caspian, where the plant is very abundant.

The bearing of these various data seems to me to be against the nativity of *Acorus Calamus* in England. The plant is certainly not a showy or conspicuous one, and might be passed over by an ordinary observer, though its peculiar and powerful odour when bruised, readily makes its presence known even to them, and its singularity of appearance then becomes striking. It may be said, I think, with certainty that such good observers as Turner, Lobel, Clusius, Gerarde, Parkinson, and Johnson, not to mention others whose names are, from not being authors, less known, could not have passed by so singular a plant,—familiar, too, to all but Turner in the garden, and to which a special interest attached, from the uncertainty and confusion prevailing as to the right name of its then much-esteemed rhizome. Besides this, we know how readily *Acorus* is established if planted in a suitable situation, and how rapidly such aquatic species will extend themselves throughout a river basin. Moreover, in this case there was a direct incentive to assist this, for the root bore a good price both as a drug and also among the brewers as a flavouring for beer. It is, indeed, generally admitted to have been planted in not a few of its stations; and as definite statements on such subjects are rarely put on record, it is well to say here that Dr. J. E. Gray, of the British Museum, tells me, that the late Mr. Wheeler,* of the Apothecaries' Company, planted it extensively about London, and that Dr. Gray himself saw this done at the well-known locality at Lord Mansfield's, Highgate (see 'Flora of Middlesex,' p. 291). It would seem still more likely for the older apothecaries to act in this manner, and they probably did so; though, even without this direct interference of man, the *Acorus* might readily become established on a river-bank in proximity to gardens (as at Fulham, the first locality recorded for Middlesex), from the rhizomes being thrown out with garden-rubbish.

Devos tells us that in 1590 and 1591 Sebitz naturalized it at Strasburg, and J. Bauhin at Belfort, and that in 1710 it had become abundant in Alsace, though wanting in France, where, indeed, it is still rare. We have seen that it was a little earlier in cultivation in Belgium, but there is no definite record of its having been intentionally planted in wild localities there.

In conclusion, when we find the history of the plant in western Europe generally agreeing so closely with that in England, we must, I think, allow that the case for *Acorus* as a native becomes still further weakened. Indeed, all the facts about the plant seem to point to south-east Europe and adjacent parts of Asia as the home of *Acorus Calamus*, and to a propagation westward by means of cultivation in botanic gardens; whilst, as far as Great Britain is concerned, it probably originated from Gerarde's garden in Holborn, whither it may have been brought from Belgium by his friend Lobel.

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* This Mr. Wheeler sowed and planted many rare species at Hampstead, in the wood called usually Turner's Wood. (See Francis's Anal. Brit. Ferns, ed. 1, p. 64.)

ON THE PHYLLOTAXIS OF LEPIDODENDRON AND THE ALLIED, IF NOT IDENTICAL, GENUS KNORRIA.

By Professor Alexander Dickson.

(*Read at the Meeting of the Edinburgh Botanical Society, April 13th*, 1871.)

The fossil remains of these plants are often so compressed that it is difficult, or even impossible, to trace the secondary spirals round the circumference of the stem. In those cases, however, where there is comparatively little compression,—*i. e.* where the stem is more or less cylindrical,—the determination of the phyllotaxis is easy. Of such stems the author had examined thirteen specimens, which may be classed according to the series of spirals to which the leaf-arrangement belongs.

A. Ordinary series, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{2}{5}$, $\frac{3}{8}$, $\frac{5}{13}$, etc.

a. Single spirals. (D, turning to the right; L, to the left.)

1. *Lepidodendron* (Possil ironstone series); stem about $\frac{3}{4}$ in. in diameter. Secondary spirals 8 D, 13 S, 21 D. Divergence $= \frac{13}{34}$ (or possibly $\frac{21}{55}$).
2. *Lepidodendron* (Knightswood, near Glasgow, Mr. J. Young). Stem about $1\frac{1}{2}$ inch in diameter. Secondary spirals 13 D, 21 S, 34 D. Divergence $= \frac{21}{55}$.
3. *Lepidodendron* (Possil sandstone series); trunk about 2 ft. long, with an average diameter of 20 inches. Steepest secondary spirals 55 S, 89 D. Divergence $= \frac{55}{144}$.

b. Conjugate spirals.

4. *Lepidostrobus ornatus* (Bathgate coal-field); about $\frac{3}{4}$ in. in diameter. Secondary spirals 10 D, 16 S, 26 D, 42 S. Divergence $= \frac{13}{34 \times 2} = \frac{13}{68}$ (bijugate arrangement).
5. *Knorria taxina* (from the collection of Dr. Rankin, Carluke); slightly compressed, 4–5 in. in diameter. Secondary spirals 15 D, 24 S. Divergence $\frac{15}{13 \times 3} = \frac{5}{39}$ (trijugate arrangement).
6. *Lepidodendron* (from Dr. Rankin's collection); about $1\frac{1}{2}$ in. in diameter. Secondary spirals 10 D, 15 S, 25 D, 40 S. Divergence $= \frac{5}{13 \times 5} = \frac{1}{13}$ (quinquejugate arrangement).
7. *Lepidodendron* (Dowanhill, Glasgow, Possil sandstone series); trunk about 1 ft. long, with a diameter of 1 ft. This stem requires further study; but 35 secondary spirals were counted to the right and 56 to the left. In all probability the secondary spirals are 7 S, 14 D, 21 S, 35 D, 56 S, 91 D. Divergence $= \frac{8}{21 \times 7} = \frac{8}{147}$ (7-jugate arrangement. So far as I am aware, no case of a 7-jugate spiral has been noted hitherto.

B. Series $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{7}$, $\frac{3}{11}$, etc.

8. *Lepidodendron* (Messrs. Merry and Cunningham's Clayband iron pit, Carluke); stem 2 in. in diameter. Secondary spirals 18 S, 29 D, 47 S. Divergence $\frac{21}{76}$.

C. Series $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{9}$, $\frac{3}{14}$, etc.

9. *Lepidodendron* (Museum, Royal Botanic Garden, Edinburgh); stem somewhat flattened, 1–$1\frac{1}{2}$ in. in diameter. Secondary spirals 9 D, 14 S, 23 D, 37 S. Divergence $= \frac{13}{60}$.

10. *Lepidodendron* (Redhaugh, near Edinburgh, Mr. Peach); stem somewhat flattened, $\frac{3}{4}$ to $\frac{1}{2}$ an inch in diameter. Secondary spirals 9 S, 14 D, 23 S, 37 D. Divergence $= \frac{13}{60}$.

D. Series $\frac{1}{2}, \frac{2}{5}, \frac{3}{7}, \frac{5}{12}, \frac{8}{19}, \frac{13}{31}, \frac{21}{50}$, etc.

11. *Lepidodendron* (from Dr. Rankin's collection); about $\frac{7}{8}$ in. in diameter. Secondary spirals 12 D, 19 S, 31 D. Divergence $= \frac{21}{50}$.

E. Series $\frac{1}{3}, \frac{3}{10}, \frac{4}{13}, \frac{7}{23}, \frac{11}{36}, \frac{18}{59}$, etc.

12. *Lepidodendron elegans* (Possil ironstone); about $1\frac{1}{4}$ in. in diameter. Secondary spirals 10 S, 13 D, 23 S, 36 D. Divergence $= \frac{18}{59}$.

13. *Lepidodendron* (Possil ironstone); about $2\frac{1}{4}$ in. in diameter. Secondary spirals 23 S, 36 D, 59 S, 95 D. Divergence $= \frac{47}{154}$.

From the above it is evident that the phyllotaxis of *Lepidodendron* is extremely variable, as much so, perhaps, as that of those most variable plants in this respect, the *Cacti*. It is also clear that what has been enunciated by Prof. Haughton* as the law according to which the leaves of palæozoic plants were arranged, viz. that of alternate whorls, does not apply to these ancient Lycopods.

A SUPPLEMENT TO THE 'FLORA VECTENSIS.'

By Alexander G. More, F.L.S., M.R.I.A.

(*Continued from page* 145.)

Lactuca virosa, L. Hedgebank by the roadside near Winford Firs, sparingly.

Hieracium vulgatum, Fries. Bordwood Heath and a sandpit in Morton Lane, Brading, are the only two localities known to me.

H. tridentatum, Fries. Far more frequent. Centurion's Copse, Bembridge; landslip near Luccombe (1857), Pan Common, New Copse, East Standen, etc.; Nunswood Copse, near Ningwood (J. G. Baker).

Campanula rotundifolia, L. A monstrosity, with the corolla cleft into five narrow segments, was found at Freshwater, by my friend Mr. F. Bond.

Wahlenbergia hederacea, Reich. On Buck's Heath, in a wet corner near to Kingston Church; also between Pile and Gladdice's Farms (Rev. Dr. Cookson).

Erythræa Centaurium, L., var. *capitata*, Rœm. et Sch. On Freshwater Down and in the warren at Alum Bay, plentifully. This is, I believe, the plant given in 'Flora Vectensis' as *E. littoralis*, which I have not succeeded in finding in the Isle of Wight.

Gentiana campestris, L. On Colwell Heath close to the "Nelson Inn" (H. C. Watson, 1861), and gathered there in 1862 by myself. On Afton Down, Freshwater, R. Tucker, 1869 (Journ. Bot. Vol. VIII. pp. 160 and 385).

**Cuscuta Trifolii*, Bab. Apparently increasing. Mr. Pristo says that it is becoming a pest in the Clover fields about Whippingham. I have myself found it at Bembridge, Yaverland, Alverstone, and between Knighton and Newchurch, etc. At Landguard (A. J. Hambrough), Apse (Major Smith); Thorley (Dr. G. R. Tate).

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* 'Manual of Geology' (London, 1866), pp. 243 and 245.

Pulmonaria angustifolia, L. In Morton Lane, near Brading, sparingly; the only station known on the south side of the Chalk Downs.

Myosotis palustris, With. By the stream above Alverstone Mill.

[*Lycium barbarum*, L. Well established among shingle close to high-water mark, on an island at the mouth of Newtown Creek (Dr. G. R. Tate, 1868).]

Verbascum Thapsus, L. Two specimens collected by Dr. Bell Salter in Morton Lane, and others labelled by him *V. thapsiforme*, from Yaverland, belong to *V. Thapsus*.

[*V. Blattaria*, L. On Brading Down, at the end of a lane leading from the village, well established, but no doubt derived from the neighbouring gardens, where it is still cultivated. Mr. Stratton cannot now find it near Carisbrooke, and, like myself, believes it was introduced there.]

†*Veronica polita*, Fries, var. *grandiflora*, Bab. A few roots at Bembridge in 1853 in company with the usual form.

**V. Buxbaumii*, Ten. Increasing. Near Sandown, Shanklin, Brading, Bordwood, Alverstone, Steephill, Newport, etc.

Digitalis purpurea, L. A monstrosity, with the corolla deeply cleft, was found near Guildford, by the late Dr. Bell Salter.

‡*Antirrhinum Orontium*, L. Gravelly fields near St. Helen's (Miss A. Deighton).

Linaria vulgaris, Mœnch, var. *latifolia*, Bromf., 'Phytologist,' vol. iii. p. 627. In its original station this plant no longer preserves the character of the large foliaceous bracts and superior size of flowers. Some specimens gathered a few years ago still partly exhibited these peculiarities, but at present, except for its wider and more glaucous leaves, the plant is nothing more than *L. vulgaris*, and I have gathered it with equally wide leaves in Guernsey.

‡ *Melampyrum arvense*, L. The locality, "near Lord Dysart's" (Steephill), given by Mr. Snooke in his 'Flora Vectiana' (1823) shows that this plant is no very recent settler. Normally a colonist, it has taken possession of some bushy slopes in the Undercliff.

Euphrasia Odontites, L. Both *E. verna*, Ball, and *E. serotina*, Lam. occur near Bembridge, but I cannot believe them anything more than slight varieties of the same species.

Bartsia viscosa, L. On the borders of a few cornfields; also in a meadow and along the lane adjoining at Foreland, Bembridge (1856), and gathered there many times since.

? Orobanche amethystea, Thuill.? On the sandhills of St. Helen's Spit, close to the gun battery, only two specimens, found in the vicinity of *Eryngium maritimum* (Miss F. M. More, 1859). These specimens were much withered, and I have not succeeded in finding the plant again; but my friend Professor Babington thinks with me that they may possibly belong to *O. amethystea*, Thuill.

O. cærulea, Vill. On a piece of heathy pasture between Landguard Farm and Merry Gardens (Mr. Hambrough). The station in Sandown Bay is now much narrowed from the gradual falling of the grassy border of the cliff.

†*Mentha rotundifolia*, L. A form with leaves more elongated than usual occurs in a hedge close to the bridge at Sea Grove, and it is this variety which has been mistaken for *M. sylvestris* in the Isle of Wight.

M. sativa, L. By the side of a stream near the cliff at Brightstone (A. J. Hambrough, 1860). In ditches, and by the stream a little above Yar-bridge. There was also a specimen labelled "Guildford" in Dr. Bell Salter's herbarium.

**M. rubra*, Smith. In a ditch near the White Cottage, between Lake and Shanklin (Rev. T. Salwey, 1857), and well established there in 1859. Hedge near the "Nelson's Arms Inn," Colwell Bay, and plentiful in the garden of the inn (H. C. Watson). Among Brambles by the roadside at Niton, close to a cottage (Rev. E. Carr).

[*Salvia pratensis*, L. The single plant mentioned in the 'Flora Vectensis' grew in a grass field, but upon land that had been ploughed not many years previously. Mr. Kirkpatrick afterwards found another plant in a different part of his land; no doubt accidentally introduced, and now extinct.]

Origanum vulgare, L., var. *virens*. Isle of Wight Dr. J. E. Gray (Comp. Cyb. Brit. p. 545).

Thymus Chamædrys, Fries. Bleak Down (A. J. Hambrough). St. Helen's Spit, and probably elsewhere, but far less common than *T. Serpyllum*.

Calamintha officinalis, L., var. *Briggsii*, Syme. Near Carisbrooke (F. Stratton, 1867).

†*Nepeta Cataria*, L. By bridle-roads in two places on Bowcombe Down (F. Stratton).

Lamium purpureum, L., var. *decipiens*, Syme. In garden ground at Bembridge.

Obs. *Lamium intermedium* must be erased from the list, Dr. Bromfield's specimens being nothing more than a variety of *L. incisum*, with leaves broader and more cuneate than usual.

Stachys palustris, L. Mr. Hambrough's specimen, supposed to have been *S. ambigua*, is only a slight variety of *S. palustris*.

Obs. †*Ballota ruderalis*. Dr. Bromfield's specimens from St. Lawrence do not belong to this but to *B. fœtida*, Lam., nor have I succeeded in finding the former.

‡*Anagallis arvensis*, L., var. *cærulea*. In a field at Alverstone (J. Pristo).

Centunculus minimus, L. Gravel pit at the junction where the road from Newport branches to Fishbourne and Ryde (Rev. A. M. Norman).

Plantago Coronopus, L. Inland on Pan Common, Bleak Down, and at Newchurch.

Schoberia maritima, Mey. The stouter and more ligneous form mentioned by Dr. Bromfield grows on St. Helen's Spit, and in other places round Brading Harbour, but is certainly no more biennial than the ordinary state of the species. Judging from the description, it seems to be the typical *S. maritima* of Dumortier, Bull. Soc. Royale Bot. de Belgique, vii. 328 (1868).

‡*Chenopodium polyspermum*, L., var. *cymosum*, Moq.-Tand. Near Shanklin, the only locality where I have found it, but var. *acutifolium*, Sm., is frequent.

‡*C. album*, L., var. *candicans*, Lam. Near Kerne, etc., not unfrequent

in cultivated ground.—Var. *paganum*, Reich. Bembridge, etc., frequent. Var. *viride*, L. Shanklin, Sandown, Bembridge, etc. Common.

[*C. ficifolium*, Smith. A specimen in Sir W. Hooker's herbarium at Kew is labelled Isle of Wight, but I have never met with the plant myself.]

†*C. urbicum*, L., var. *intermedium*, M. & K. At Hide Farm, near Shanklin, I once found a plant producing on one branch cymose clusters of flowers, accompanied by a leaf nearly entire, while the rest of the leaves were toothed, and flowers in panicles as usual.

†*C. rubrum*, L., var. *pseudo-botryoides*, Wats. The plant which grows at Hardingshoot Pond belongs to this form, but Dr. Bromfield raised the typical *C. rubrum* from seeds taken from the dwarf decumbent form, so that I do not see how it can rank as a proper variety. I have seen the typical *C. rubrum*, L., only once at Bembridge.

Salicornia herbacea, L. A very slender dwarf form, quite prostrate, and little branched, occurs near Newtown on ground from which the turf has been recently pared. The spikes are acute, but the internodes as in ordinary *S. procumbens*, Sm., so that it does not agree with *S. appressa* of Dumortier, but nearly with *S. pusilla* of Mr. Joseph Woods. (Phyt., o. s., iv. p. 309, 1851.)

S. radicans, Sm. Wootton Creek (A. G. M.). By the West Yar (Dr. G. R. Tate). Two forms of this occur on the shores of Brading Harbour. On the harder mud grows a plant with a stout, central, woody root, often half an inch in diameter, round which spread the decumbent lateral branches, which scarcely at all take root at the joints. This, I believe, represents *S. fruticosa*, L., and *S. lignosa* of J. Woods, l. c. But in the soft, pulpy mud the branches take root in all directions, while the original stock decays as they advance, leaving an interwoven mass of slender roots creeping in all directions. This latter is the proper *S. radicans* of Smith. I was unable to see any difference between the seeds of these two forms, and I may remark that M. Duval Jouve, in his elaborate paper on the French *Salicorniæ*, published in the Bulletin of Bot. Soc. of France, vol. xv. p. 165 (1868), does not show any great difference between the seeds of his two species, *S. sarmentosa* (*radicans* of Smith) and *S. fruticosa*. The observations of Lloyd in his 'Flore de l'Ouest,' p. 417, seem to agree very closely with my own experience, and I think that we may safely claim *S. fruticosa*, L., as an Isle of Wight plant.

Atriplex littoralis, L., var. *marina*, L. On the gravelly point at Bembridge. Bank of the Medina, near East Medina Mill (F. Stratton). Shore below Bouldner (Herb. Bromfield). *A. littoralis*, L., is frequent.

A. patula, L., var. *A. angustifolia*, Sm. Very common.—Var. *erecta*, Angl., *serrata*, Syme. Near St. Helen's, Sandown, etc., frequent.

A. hastata, L., var. *A. deltoidea*, Bab. In garden ground at Bembridge, and, in its prostrate form, very common along the muddy embankments of Brading Harbour, at Luccombe, Bonchurch, Yarmouth, etc.

A. Smithii, Syme; *A. patula*, Sm. Common.

A. Babingtonii, Woods. Plentiful on shingly and sandy beaches, and occurs also along the tidal creeks. In salt marsh ground, I have noticed a form which differs from the ordinary *A. Babingtonii* by the elongated shape of the fruit calyces, many of which are irregularly shaped.

A. arenaria, Woods; *A. laciniata*, Flor. Vect. St. Helen's Spit. Sandown Bay. Norton's Spit and Totland's Bay. Rather rare, but I believe all the stations given in 'Flora Vectensis' for *A. laciniata* belong to this species.

Obs. *A. nitens*, Reb., I have not succeeded in finding on the shore near Ryde, so that it has probably become extinct, and was, no doubt, the outcast of some garden.

Rumex pratensis, M. et K. In a meadow between Centurion's Copse and Brading Harbour (Rev. W. W. Newbould). Gurnard Bay and by the Medina (F. Stratton). In several localities near Bembridge. Between Shanklin and Luccombe. Brading marshes. On the shore at Norton, etc. Judging from the irregular shape of the enlarged petals, this is rather the hybrid *R. obtusifolio-crispus*, if that can be distinguished from *R. pratensis* proper.

R. sanguineo-crispus. A plant occurs here and there about Bembridge which is intermediate between *R. crispus* and *R. sanguineus*, nearer the latter; its leaves are curled and narrowed to the base; sepals as in *R. sanguineus*, but twice as large and wider; the flower-spikes much tinged with red; I believe it is a hybrid. With it occurs another plant, which differs in having the sepals slightly denticulate, and which, in a series, would take its place between *R. sanguineus* and *R. pratensis*.

Polygonum Persicaria, L., var. *elatum*, Gren. et Godr. = *P. nodosum*, (Journ. of Bot. ix. 37). In Sandown Marshes, but much rarer than the normal form.

P. mite, Schrank. A single plant in the marshes north of Pan Common, September, 1858. This specimen was found growing with the typical *P. minus* and *P. Persicaria*, and was also accompanied by what I think is a very tall and large form of *P. minus*, much resembling Reichenbach's figure (Ic. Bot. v. 493), but which Dr. Boswell Syme is inclined to refer to *P. mite*. A number of specimens which I collected at the same time seem to form a complete series, ranging from typical *P. mite* to the usual small form of *P. minus;* and I strongly suspect that they include some hybrids that might be called "*minori-persicaria*."

P. aviculare, L. The following forms occur:—Var. *P. agrestinum*, Jord. In cornfields and cultivated ground, frequent. To this I should refer the plant noticed by Dr. Bromfield (Phyt. iii. 763) as resembling the American *P. erectum*. Var. *vulgatum*, Syme. Common at the foot of walls, along waysides, etc. Var. *P. arenastrum*, Bor. On St. Helen's Spit, and probably elsewhere. Var. *P. microspermum*, Jord. On the shore in Sea View Bay and on St. Helen's Spit. The specimens from both localities have been identified by Professor Boreau. Var. *rurivagum*, Jord. This is the var. *segetale*, of Bromfield (Phyt. iii. 763), and is very common in stubbles and among crops, especially on a calcareous soil. Var. *P. littorale*, Link. On St. Helen's Spit with *P. Raii* (A. G. M.). Totland's Bay (F. Stratton).

P. Raii, Bab. St. Helen's Spit; Spit at Hampstead; west side of Newtown Creek (A. G. M.). Shore between Yarmouth and Bouldner (J. G. Baker). Norton Spit, Totland's Bay, Colwell Bay, and Freshwater Gate (Mr. H. C. Watson).

P. Convolvulus, L., var *β. pseudo-dumetorum*, Wats. Near the church at St. Lawrence, and in cornfields near Luccombe. Shore at East Cowes (F. Stratton).

Thesium humifusum, De Cand. On the sandhills of St. Helen's Spit near the mill pond.

‡*Euphorbia platyphylla*, L. Cornfields near the windmill at Bembridge and on Bembridge Down; at Carpenter's, near St. Helen's; cornfields above Steephill; at Hampstead, Shalfleet (Dr. G. R. Tate). Alverstone, Whippingham (J. Pristo).

E. Paralias, L. One plant on the sandy shore of Gurnet Bay, 1868 (J. Pristo), probably sprung from seed carried by sea from Hayling Island. Still flourishes on St. Helen's Spit and at Norton, where it was planted by Dr. Bromfield.

Urtica dioica, L., var. *angustifolia*. Lower Hide Farm, near Shanklin! (Rev. T. Salwey).

‡*Ulmus*. I do not think either species of Elm is indigenous in the Isle of Wight. Trees so commonly planted, whose roots run so far, and whose seed is so easily scattered, require stronger evidence in their favour than I have yet seen; and there are in the Isle of Wight scarcely any upland copses where the Elm might be expected to occur as native.

‡*Salix triandra*, L. Redhill Farm, Appuldurcombe (Herb. Bromfield). The specimen is from a female plant, and is marked as doubtfully native.

‡*S. fragilis*, L. Marshcombe Copse, Yaverland; near Yar Bridge; near Kerne Farm; Lower Knighton, etc., but not in any locality where it can be considered native.

S. acuminata, Sm. The Willow from Northwood Park, preserved under this name in Dr. Bromfield's herbarium, is referred by Professor Babington and Mr. J. G. Baker to *S. Smithiana*, Willd., var. *rugosa*, but I have gathered in Marshcombe Copse a plant which exactly corresponds with the figure of *S. acuminata* in 'English Botany,' and this seems to be a hybrid between *S. capræa* and *S. viminalis*.

Obs. *S. laurina*, Flor. Vect. Some imperfect specimens from Barnsley Farm, preserved under this name in Dr. Bromfield's herbarium, belong to *S. cinerea*, L., and it is to be feared that the *Salix* noticed near Newtown by Mr. Borrer was the same, or, if correctly named, it must have been planted. *S. acutifolia*, *S. cærulea*, *S. vitellina*, *S. triandra*, etc., are cultivated in the Willow beds, but the only species which appear certainly indigenous are *S. repens*, *S. aurita*, *S. cinerea*, and *S. capræa*.

‡*Juniperus communis*, L. I have only seen the single bush which grows on the down above Nunwell, and on it I found several well-formed and fertile-looking berries in April, 1860.

(*To be continued.*)

SHORT NOTES AND QUERIES.

Plants of Staffordshire.—In reply to the Rev. W. A. Leighton (see p. 112), I am able to state that Cannock Chase is about 760 feet above the sea level, and Sutton about 450 feet. The flora of Sutton Common is more boreal than alpine, I think, containing an abundance of *Ulex europæus*, *Calluna vulgaris*, *Erica cinerea*, *E. Tetralix*, with here and there scattered tufts of *Triodia decumbens* and *Molinia cærulea*. I also find *Parnassia palustris* and *Jasione montana*, but never abundant here. The flora of Cannock Chase is much the same as that of Sutton.—J. Bagnall.

PERIANTH (p. 112).—The term 'perianth' seems to me to be too useful to discard. It should, however, be used as a collective term for the floral envelopes. We may thus have the perianth in its perfect form separable into two parts—the calyx and corolla. Then, again, either the outer or inner portion may be wanting, or the two series may be similar, either both calyx-like, calycoid, or both more or less brightly coloured or corolloid.—W. R. M'NAB.

PLANTS OF CO. CORK.—*Scirpus Savii;* not recorded up to this from District No. 2 of 'Cybele Hibernica,' but occurs abundantly in the east of the county.—*Carex divulsa;* apparently a very rare plant in Ireland, but not unfrequent in this county. It occurs at Midleton, and in the extreme west near Bantry.—*C. limosa;* not recorded from this county hitherto, but found twice by me last summer, near Glengariffe, at base of the Sugar Loaf, and on Bluefort Bog, Newmarket.—*C. filiformis;* stated by Drummond to grow in Ballyphehane Bog, near Cork, but not seen there lately. I found it last summer abundantly in a lake at head of the Glengariffe Glen.—*C. paludosa;* not recorded from the county. I have found it here at Dumfort Bog, and again in the west near Dunmanway.—T. ALLIN.

VERONICA TRIPHYLLOS, *L.*—One of my pupils lately found this in a cornfield near Rugby, where several other Veronicas were growing. Its occurrence here so far away from the eastern counties, its proper habitat, seems worthy of record.—F. E. KITCHENER.

CRITHMUM MARITIMUM.—In the last number of the Journal (p. 143) the shingly beach at Newton Creek is called a "most unusual locality" for *Crithmum maritimum*. Surely this is not the case; the plant is not abundant in Sussex, but I find it here and there on the beach all along the coast from Rye to Chichester Creek, and I have seen it in several similar places in other parts of England.—W. W. REEVES.

APPLICATIONS OF SOME BRITISH PLANTS.—The Carices are not noted for their economic value, but in isolated country districts we may often see some novel application of a native product little thought of by the residents of large towns. The *Carex paniculata*, L., a plant growing in wet copses and marshes, would appear to be of no interest economically, yet the dense tufts of this plant, which attain a large size in the Norfolk fens, are cut by the peasantry, and used to a certain extent in some parts of the county, as well as in Sussex, for kneeling-hassocks in churches. They are very durable, and have been known to last over fifty years. The stems of *Scirpus lacustris* and *Typha latifolia* are, of course, more generally used, but these are platted, while the tufts of the Carex require no preparation. In Yorkshire and Cumberland it is not uncommon for the Hair Moss, *Polytrichum commune*, to be used both for hassocks and brooms. In Lapland, the natives remove large masses of this Moss from the ground just above the roots, and use them for making beds and for coverings instead of blankets.—J. R. JACKSON.

FLORA HANTONIENSIS (p. 160).—There seems to be now some likelihood that the long-desiderated 'Flora of Hampshire' will, at no distant date, be taken in hand. Early information (not given, I think, in Dr. Bromfield's fine contribution to the subject) could be collected by the carrying out of some such plan as I have sketched out in the Journal, Vol. VIII. p. 158. I have not paid much attention myself to the county in my reading, except as regards such matter as bore upon the Isle of Wight; so that, besides references to Gerarde, I can only, at present, give the ollowing scant information:—Lobel, 'Illustrationes Stirpium' (1655), . 85; Johnson's 'Mercurius Botanicus' (1634), pp. 21, 22, 59, pars ltera (1641), p. 30; Parkinson's 'Theatrum Botanicum' (1640), p. 640, 1167, 1485; and Robson's 'British Flora' (1776), p. 161.—OBERT TUCKER.

TRICHOMANES RADICANS IN ENGLAND.—In a recent number of 'Nature,' (vol. iii. p. 509,) Mr. E. F. im Thurn gives a locality for this species in Cornwall. He states that he found it "on a rock overhanging the water about a quarter of a mile below the fall" at St. Knighton's Kieve, on the northern coast of the county, in August, 1867. In the succeeding year, during a hurried visit, he was unable to see it. In the next number of 'Nature,' (vol. iv. p. 8,) Mr. W. P. Dymond, of Falmouth, corroborates the fact, and adds that the Fern was first recognized at the spot by Mr. R. W. Fox, in 1866. Mr. im Thurn has kindly communicated to me some additional details. The waterfall in question is about two miles from Tintagel Castle, and the same distance from Boscastle; a single patch only was seen, and the fronds were probably not much over two inches in height. He has no doubt of the identity of the plant, but, being separated from his herbarium, is unable at present to submit the only frond he gathered to my examination. With reference to the probabilities of its introduction at the fall, Mr. im Thurn writes:—"The rocks about the waterfall are exactly of the kind on which the *Trichomanes* usually grows, and if there is any one in the neighbourhood with a taste for the cultivation of Ferns they may, of course, have tried the experiment of introducing the plant. Again, the waterfall, which is romantic enough to attract many visitors, is, with a certain amount of ground round it, enclosed, and let to a man who makes a show of it. The Ferns of other species growing about the fall are remarkable for their great luxuriance, and are much admired by visitors, A smattering of fern-lore being so common amongst tourists, it is by no means impossible that the lessee of the waterfall may have attempted to add to its attractions by planting rare Ferns. Notwithstanding all this, my own impression is that it was not an introduced plant, for which opinion my reasons are as follows: Firstly, the plant was not growing close to the waterfall, the part generally visited, but some little way down the stream, almost, if not quite, beyond the range of ordinary visitors. Secondly, it is scarcely probable that a man who has to repay himself for a heavy rent by the fees obtained from visitors during the short summer season would be able to expend much in plants as rare, expensive, and insignificant as the *Trichomanes*, especially since it would be passed unnoticed by all but a few of his customers. Thirdly, and lastly, the plant showed no visible signs of introduction, and was of the wild form, and not of that slightly different form which it assumes under cultivation." Under these circumstances, it will be best for the present to withhold from the *Trichomanes* an unqualified admission into the flora of Cornwall. There is, however, undoubted evidence of its existence in England at a time previous to the introduction of the popular taste for Fern culture. In the first volume of this Journal (p. 238), attention was drawn by Mr. T. Moore to Dr. Richardson's specimens from Bingley, Yorkshire, in the British Museum; and in the Banksian herbarium there is another specimen from "Belbank, Yorkshire" (the same locality), collected by Hudson. These Yorkshire plants are but an inch or two high. There are also in the Museum very luxuriant specimens from Carnarvonshire, collected in 1863 by Mr. Backhouse. In this locality, however, there is reason to suspect an intentional introduction, as is also the case in the parallel habitats in Westmoreland and Arran, recorded in this Journal, Vol. I. pp. 238 and 293, and Argyle, given in Watson's 'Compendium,' p. 604. The county of "Derbyshire" is mentioned in 'Nature' (vol. iii. p. 333) as formerly producing this rare Fern, but I suspect some error in this. Still, there is sufficient probability of coming upon *Trichomanes* in a wild state in England to render worth while a special search in suitable localities.—HENRY TRIMEN.

FLORA VECTENSIS.—In continuation of my remarks (Vol. VIII. p. 384), I may state that the Sloane MS. 591, ascribed to Dr. John Pratt, (cf. p. 15 of the present volume,) gives localities for *Samphire*, *Fucus marinus*, male and female Mercury, agreeing with those given in Vol. VIII. p. 159. I find no mention of Isle of Wight plants in Blackstone, 'Specimen Botanicum' (1746), nor do I come across any record in Dr. W. G. Maton's 'Scenery of the Western Counties of England' (1797), nor in J. Hassell's 'Tour of the Isle of Wight' (1790). There is a like silence in W. Gilpin's 'Observations on the Western Parts of England, relative chiefly to Picturesque Beauty, to which are added a few Remarks on the Picturesque Beauties of the Isle of Wight' (1798). Richard Warner, in his 'Collections for the History of Hampshire,' etc. (in six vols., 1795), gives the Ryde habitat for *Mercurialis mas et fœmina* (vol. iii. p. 32), on the authority of the 'Magna Britannia,' and *Mercurialis annua* (vol. iii. p. 34), from Gough's 'Camden.' I come now to the 'Rural Economy of the Southern Counties, comprising . . . the Isle of Wight,' etc., by W. Marshall (1798). This author writes (vol. ii. p. 254), "Out of the face of the cliff (near St. Catherine's) shrubs and herbaceous plants are seen in great abundance, and to the eye glancing over them the species appear numerous." Then, on p. 280, he remarks, "The most extraordinary circumstance which arose in examining the crops of the Isle of Wight is, that not an acre, nor even a plant of Sainfoin, met the eye! Even on the whole extent of calcareous lands that I traversed! I do not mean to assert that there is no one instance of Sainfoin being grown in the island; but, from the inquiries made, I learnt that there was, in 1791, very little, *if any*, then growing! And the reason given for this neglect of it was, that 'it soon goes off;' an extraordinary circumstance (seeing the nature of the soil), which is only to be explained in the calcareous lands of this island having been repeatedly cropped with this valuable plant, or by some impropriety in the management of the growing crop." (Compare Mr. A. G. More on this plant, p. 140.) On p. 287, we find "The Turnip crop is shamefully managed in this island; not one acre often appears to have been hoed. To-day I saw a waggon load of Charlock an acre, where Turnips were doubtless intended; and yesterday not a less burden of the common Bugloss (*Lycopsis arvensis*)." I now pass on to the 'Delineator, or a Picturesque, Historical, and Topographical Description of the Isle of Wight,' by James Clarke (2nd edition, 1814; 6th edition, 1824). In this we have, "The Bee and Fly Orchis are found near Carisbrooke Castle and several other places in the island" (2nd edition, p. 77; 6th edition, p. 68); also, "there are several at Sir William Fitzwilliam Barrington's, Bart., Swainston." The *Digitalis* and Rock-samphire are also mentioned in both editions. Englefield's 'Isle of Wight' (1816) is mostly concerned with the geological aspect of the island, but on p. 53 he writes:—"The observation of the sudden changes of the whole look of the vegetation, correspondent to the changes of the subsoil, which Dr. Maton, in his 'Western Tour,' mentions with the detail of an experienced botanist, had occurred to me constantly in my different tours in the island, and had guided me in a very instructive manner as to the succession and limits of the different subsoils, where no openings of the ground were to be found to aid research. The geologist would do well to pay constant attention to such indications; and there is something peculiarly pleasing in seeing sciences not apparently related thus mutually tending to the advancement of both. How false and contemptible is the supercilious pride of him who dares despise even the most apparently trifling observation on, or humble investigation of, the great and infinitely varied spectacle of nature!" My last quotation consists of the last sentence in the description of the Isle of Wight by Robert Mudie, Hampshire (vol. iii. I. of W. p. 226), 1838:—"The botany and zoology of the Isle of Wight present nothing peculiar." I have not been able to consult J. Albin's 'Isle of Wight Magazine' (1799); W. Cooke's 'Picture of the Isle of Wight' (1813); nor John Sturch's 'Isle of Wight' (1791). In conclusion, I hope to make some further remarks on the modern condition of the flora, when Mr. A. G. More's valuable paper has been completed.—R. TUCKER.

LUMINOUS FUNGI.—Two years ago I had some specimens of luminous fungi sent to me from the Cardiff coal-mines; they were parasitic on the shoring timbers, and both fungi and mycelium were phosphorescent. The colliers in the coal-mines of the western boundary of Glamorganshire and adjoining Caermarthenshire are well acquainted with these phosphorescent fungi, and the men state that they give sufficient light to "see their hands by." In another coal-mine, seven miles north of Cardiff, some colliers told Mr. William Adams that they had seen lights on the timber when travelling in the dark, and one of them said he was much frightened the first time he saw them. The luminous fungi sent to me from these mines were specimens of *Polyporus annosus*, Fr., and they could be seen in the dark at a distance of twenty yards. I have also seen *P. sulfureus*, Fr., phosphorescent, and Mr. Broome has met with a luminous *Corticium*. I have heard that *C. cæruleum*, Fr., is sometimes luminous. Berkeley says that *Agaricus (Crepidotus) olearius*, Fr., a parasite of Olive-trees, is sometimes so luminous in the south of France that letters may be distinguished by its light. A short time since I had a dried Agaric (probably a *Collybia*) given me through Professor Church, of Cirencester, which was phosphorescent when gathered; it came from a cellar in Oxford Street.

The luminous fungus referred to in the March number of 'Science Gossip,' seems to be the same with *Agaricus Gardneri*, Berk., an interesting account of which was laid before the Linnean Society in 1869, in a letter from Mr. Collingwood. The writer stated that this species in Borneo could be distinctly seen in the dark, shining with a soft pale greenish light; the older specimens were described as possessing a greenish luminous glow, like the glow of the electric discharge. The mycelium of this species, like the mycelium of *Polyporus annosus*, Fr., mentioned above, was luminous. It was stated that Mr. Hugh Low had once seen the jungle all in a blaze of light, by which he could see to read as he was riding across the island by jungle road. Several other species are mentioned as phosphorescent in Berkeley's 'Introduction to Cryptogamic Botany,' p. 265. I have several times observed flowers to be luminous, especially during certain atmospheric conditions in midsummer; such instances as the luminosity of stale fish, potatoes, etc., are of course known to every one. A year or two ago, when returning home through Epping Forest at night, after a long day's excursion, I saw a very luminous object on the ground in the distance; on nearing it I found it to be a dead rat, which I brought home in my vasculum, and laid on the garden bed, where it preserved its luminosity for several nights.—WORTHINGTON G. SMITH *in 'Science Gossip.'*

Reports.

ADDITIONS TO THE BRITISH LICHEN-FLORA.

BY THE REV. JAMES M. CROMBIE, M.A., F.L.S.

No. II.

In addition to those formerly recorded in Vol. VIII. p. 95 of this Journal, as supplementary to my Lich. Brit. Enum., there now fall to be enumerated the following species, which chiefly since that time have been gathered and determined. Several are again *new species*, the majority of which were collected by myself last autumn, during a short excursion to the Blair Athole district, in the central Highlands of Scotland. This tract hitherto, as it would appear, quite unexplored by any lichenologist, yielded a very goodly number alike of rarities and of novelties, the majority of the latter being still undetermined.

Pyrenopsis fuscatula, Nyl. Enum. 144. On rocks in maritime tracts. Rare in the Channel Islands, where it has been gathered sparingly, at Noirmont and Le Moge, Jersey (Larbalestier).

Calicium retinens, Nyl. in Flora, 1868, p. 161. On the bark of Oak in maritime tracts. Apparently rare in the Channel Islands, and gathered only very sparingly in Jersey (Larbalestier), although, from the small size of the apothecia, it may have been overlooked elsewhere.

Alectoria capillaris, Ach. L. U. 593. Not uncommon with var. *cana*, Ach., on old Pines in the Highlands of Scotland, at least in Braemar, but always barren. From *A. jubata* it is distinguished by the greyish colour of the thallus, and by the reaction K ±; the former with its vars. *prolixa*, Ach., and *chalybeiformis*, Lin., having olive-brown thallus and reaction K =, according to Dr. Nylander.

Sticta ciliata, Tayl. Fl. Hib. 2, 152. This, according to authentic specimens from Taylor in Herb. Brit. Mus., is only a muscicole state of *Sticta Dufourei;* and, indeed, as appears from one of the above specimens, Taylor was latterly aware of its being only a var. of *S. sylvatica.*

Lecanora phlogina, Ach.? Nyl. L. P. 121; *Placodium citrinellum*, Hepp. Flecht, 395. On Oak-bark in lowland maritime tracts. Rare, and gathered but very sparingly near Fairlight, Hastings (Crombie), though it may be expected to occur elsewhere in the south of England.

L. Parisiensis, Nyl. Jard. Luxemb. p. 368. On the trunks of trees in lowland tracts. Apparently local, as near Shanklin, Isle of Wight (Holl); though I have seen specimens from various localities in the south of England closely approaching it, but not sufficiently typical.

L. atriseda (Frs. L. Ref. 149), Nyl. Scan. 170. On schistose mountainous rocks. Rare, and gathered only near Dolgelly, in Wales (Holl). It is closely allied to *L. badia*, of which Fries regarded it as merely a variety.

L. scruposa, var. *parasitica*, Smmrf. Lapp. 100 (*ecrustacea*, Nyl. Prod. 96). Parasitic on thallus of *Cladonia pyxidata.* Not common in subalpine tracts, as on old Ash-trees in Glen Lochay, Breadalbane (Crombie).

Dirina repanda, Frs. S. O. V. 285. On rocks in maritime tracts. Rare, and local in the Channel Islands on coast of Herm (Larbalestier).

Lecidea parissima, Nyl. in litt. sp. n. On old pales in damp shady places in lowland tracts. Apparently rare and local, near Hendon, Middlesex (Crombie). It is closely allied to some states of *L. denigrata;* but amongst other marks of distinction has the hymeneal gelatine yellowish wine-coloured, and not bluish with iodine.

L. enclitica, Nyl. Lapp. Or. 148. On old fir-pales in subalpine tracts. Perhaps not very rare, though as yet gathered only sparingly in Glen Tilt, Blair Athole (Crombie); but from the small size of the apothecia, and their being so much scattered, it may have been overlooked elsewhere.

L. endopella, Leight. in litt. sp. n. On fir-pales in subalpine tracts. Rare in Glen Fender, Blair Athole (Crombie, August, 1870). It is allied to the preceding, from which it is distinguished chiefly by the larger and crowded apothecia, and the spores having two rather large nuclei.

L. melanochroza, Leight. in litt. sp. n. On decaying fir-pales in subalpine regions. Rare and local, near Loch Tummel, Perthshire (Crombie, August, 1870). The thallus is almost furfuraceous, and the apothecia internally pale violet-black, as if stained with ink.

L. alociza, Mass. Symm. 42. On calcareous rocks in subalpine tracts. Perhaps not uncommon in hilly regions, though as yet gathered only near Buxton, Derbyshire (Holl.), and, at first sight, not to be distinguished from other externally similar species.

L. Bouteillei (Desmaz.), Nyl. Lapp. Or. 152. On box-leaves in maritime tracts. Apparently local in the Channel Islands, as in Jersey (Larbalestier), and also in the south of England, as near Hurst in Sussex (Davies).

L. sublatypea, Leight. in litt. sp. n. On micaceous stones of walls in mountainous regions. Very sparingly in Glen Fender, Blair Athole (Crombie, August, 1870). Externally it very much resembles states of *L. latypea*; but the thalline reaction (K—), as well as other minor characteristics, show it to be distinct.

L. ampholera, Leight. in litt. sp. n. On gneissic stones of walls in hilly tracts. Rare and local at Hill of Ardo, near Aberdeen (Crombie, August, 1870). The thallus is like that of *Pilophoron fibula*, and the apothecia are partly innate, prominent and clustered. The spores are not unlike those of *L. lapicida*, but the character of the thallus and the brown hypothecium keep them distinct.

L. sub-Kochiana, Nyl. in Flora, 1869, p. 85. On schistose rocks in subalpine and maritime regions. Perhaps not unfrequent, as on Cader Idris (Leighton, 1864), and on the coast of Kincardineshire (Crombie, 1865), though not distinguished till Nylander's description, as above.

L. nigro-glomerata, Leight. in litt. sp. n. On quartzose stones in bare alpine places. Very rare on summit of Ben-y-gloe, Blair Athole (Crombie, August, 1870). Externally it has a general resemblance to *L. didncens*, but is sufficiently distinguished by the squamulose dispersed thallus, the colourless hypothecium, and the apothecia internally colourless.

L. triphagmia, Nyl. Prod. 141. On shady rocks in subalpine tracts. Rare and local, having as yet been detected only very sparingly on Morrone, Braemar (Crombie). The usual and typical corticole state may also be expected to occur in the Highlands.

L. leucloclinella, Nyl. in litt. sp. n. On rocks in subalpine regions. Apparently local, having been found only on Lythe Hill, Salop (Leighton). It is described in Mudd's 'Manual' as a var. of *L. verruculosa*, under the name of *L. spuria*, Schær, and as such is also issued by Leighton, Exs. 189, from which, however, it is readily distinguished by the *white* hypothecium.

L. lenticularis, var. *Gagei* (Hook. Br. Fl. iii. 177)=*Lichen dolosus*, E. B. 2581. On slate rocks in subalpine tracts. Apparently rare and local in S.W. Ireland. An authentic specimen, *manu* Sir W. Hooker, occurs in Herb. Brit. Mus., from the O'Donoghue's Prison, Killarney (Sir T. Gage). It is evidently to be regarded as a subspecies of *L. lenticularis*, from which it is distinguished chiefly by the determinate rusty-brown thallus, in small circular patches, and the minute dark-brown apothecia with paler evanescent margin. The *Lichen Gagei* of E. B. 2580, is, according to authentic specimens from Tayl. in Herb. Brit. Mus., only a young state of *Bæomyces anomalus*, Tayl., as in my Enum. p. 65.

Glyphis labyrinthica, Ach. Syn. 107. On the trunks of trees in subalpine regions. Rare and local in S.W. of Ireland, where it was formerly gathered about Killarney by Sir T. Gage. This is a most interesting species, belonging to a genus essentially tropical, though in recent years it does not appear to have been again gathered in the above locality.

Verrucaria fusco-argillacea, Anzi. Langob. 368. On moist calcareous boulders in mountainous tracts. Rare, and as yet gathered only sparingly on Craig Tulloch and at base of Ben-y-gloe, in Blair Athole (Crombie).

V. Henscheliana, Krb. S. C. G. 336. On schistose rocks in mountainous tracts. Apparently local, as on Ben Voirlich (Dr. Stirton) and Craig Tulloch (Crombie), but may be expected to occur elsewhere amongst the Grampians.

Melanotheca diffusa, Leight. in litt. sp. n. On the smooth bark of trees in mountainous tracts. Apparently rare and local, having as yet been found only on Nant Gwynant, Snowdon (Leighton, 1865).

REPORT OF THE CURATOR OF THE BOTANICAL EXCHANGE CLUB FOR THE YEAR 1870.

(*Revised by the Author.*)

I regret to have to notice this year a large increase in the proportion of non-contributing members to those who send parcels. I would beg to suggest to the members that an increase of contributing members is essential to the continuance of the Exchange Club, and I would urge them to try and enrol new contributors among their friends, so as to enlarge as much as possible the area from which plants can be collected for distribution. Great credit, for the numerous interesting species sent, is due to those who have collected plants for the club this year, among which the following are the most deserving of notice:—

Thalictrum Kochii, Fries. "Loch Conn, co. Mayo; new to the Irish flora."—A. G. More.

Nuphar pumila, DC. "Loch Lubnaig."—A. Craig Christie. I do not recollect that this local plant has been recorded from the Loch above mentioned, though it has been long known to grow in the Loch of Menteith, in the same county, about five or six miles distant from Loch Lubnaig.

Alyssum incanum, L. "Some scores of plants were seen in two clover fields in Surrey, about a dozen miles apart; one being at Pirford, the other at Frimley. As I had never, before 1870, been within half a mile of either field, I cannot say whether the occurrence of the plant was limited to that year. Further particulars stated in the 'Journal of Botany' for December, 1870."—H. C. Watson.

Sisymbrium polyceratium, L. "Charleston, Fife, introduced with ballast? in great quantity."—A. Craig Christie.

Erysimum cheiranthoides. "This plant is a common weed in and around Buxton. I have noticed it for several successive years."—Augustin Ley.

Brassica campestris, L. (?) "A series of specimens from the Thames side, in Surrey, to illustrate the gradual change, from the rough and clear green leaves of the young plant, to the smooth and subglaucous leaves of the flowering stage. This plant is plentiful in various spots along the course of the Thames, in Surrey and Middlesex, where it has been perfectly established for many years. A doubt of its original nativity there is suggested by the fact that it seldom (if ever) spreads more than very short distances from the river into the neighbouring fields. Except in the constantly thin and stringy root, it scarcely differs from the cultivated Turnip. In other respects it appears to have closer affinity with the Turnip than it has with the Wild Navew, or *Brassica campestris*, figured in 'English Botany.' All three are clearly distinct from the Swede Turnip of agriculture—easily known from them by the glaucous hue of the radical leaves, even the earliest, and the pale buff-orange tint of its considerably larger flowers. See 'Journal of Botany' for December, 1870."—H. C. Watson.

Polygala calcarea, F. Schultz. "Swincombe Down, Oxon."—J. F. Duthie. I am not aware that *P. calcarea* has been recorded from Oxfordshire, although it is plentiful on the Berkshire side of the river.

Dianthus prolifer, Linn. "Near Southsea, Hants. Not very recently recorded from this coast."—Fred. Stratton.

Silene maritima, With.? "Specimens of a plant, most like this, but by the many-flowered panicles, and not densely matted barren stems, showing some likeness to *Silene inflata*, Sm. They grew just opposite the town of Saltash, on the Devon side of the Tamer, which at the point indicated is a tidal river."—T. R. ARCHER BRIGGS. These specimens are almost identical in appearance with the form which ordinary *Silene maritima*, from Shoreham, Sussex, assumed when transplanted to the garden of my former residence, in Adelaide Road, London, where it grew in a shady situation. In Balmuto garden, however, the same species, transplanted from Seafield, Fife, has retained its normal appearance.

Sagina ciliata, Fries. Orrock Hill, Fife, J. BOSWELL SYME; and North Queensferry, Fife, A. CRAIG CHRISTIE. In the former station this plant grows in profusion at the east base of the hill, along the road leading from the Kirkcaldy and Aberdour Turnpike-road to Orrock Farm.

Spergularia neglecta, Syme. "Tabley roads, Knutsford, Cheshire."—J. L. WARREN. Notable as being an inland station for a plant which is ordinarily maritime. (See Journ. Bot. VIII. p. 252.)

S. rupicola, Lebel. (*rupestris*, Lond. Cat.). Maritime rocks, Colvend, Kirkcudbrightshire, F. BUCHANAN WHITE; and Dingle rocks, south of Liverpool, Lancashire, J. HARBORD LEWIS. This plant was first introduced into the British list, in the 'London Catalogue' of 1857, on my own authority, from specimens collected in Guernsey in 1853. In 1860 it was detected in Britain proper, in the Isle of Wight, by Mr. A. G. More. Since then it has been found along the south and west coast, from Dorset to Cheshire. Mr. Lewis now sends specimens from Lancashire, and Dr. Buchanan White traces the plant into Scotland.

Linum angustifolium, Huds. Herefordshire. "I am informed by the Rev. W. H. Purchas that the locality from which I send it, is the only *certain* locality in the county of Herefordshire. I noticed it at this spot some years ago; and again found it there abundantly this year."—AUGUSTIN LEY.

Tilia grandifolia, Ehrh. "Keswick, Cumberland. Not recorded in 'Compendium of the Cybele Britannica' for the lake province. *T. intermedia*, DC., is the common form; but there are numerous trees of *T. grandifolia* along the western side of Derwentwater."—CHARLES BAILEY. "I have seen it in several places in the lake district, but none where it looked really wild."—J. G. BAKER.

Hypericum bæticum, Boiss. "From Devon stations, near Plymouth. The flowers of the plant from Warleigh are rendered smaller than usual by drought. The Common Wood specimens, with larger flowers, were collected after the weather had become wetter."—T. R. ARCHER BRIGGS.

Sarothamnus scoparius, Koch, var. *albus*. "Roadside, between Nairn and Cawdor, N. B."—J. DUTHIE.

Trifolium hybridum, Linn. "Knutsford, Cheshire."—J. L. WARREN.

Geum intermedium, Ehrh. "Skipton, Yorkshire. Very common between Skipton and Bolton Abbey. *G. rivale* and *G. urbanum*, particularly the former, also abundant."—C. BAILEY.

"*Rosa canina*, var.?" Near Richmond, York; J. WARD. "Belongs to *R. tomentosa*, not *R. canina*, the form characterized by the combination of simply toothed leaves, with a glabrous peduncle and calyx. It touches close upon *R. farinosa*, Rau, and *R. cinerascens*, Dum.; but I do not know that it has been specially named."—J. G. BAKER.

Rosa micrantha, Sm., var. *Briggsii*, Baker. "Collected from the plant so named by Mr. Baker in his recent 'Monograph of the British Roses.' Specimens from Fancy Wood, of another naked-peduncled form of *R. micrantha*, with very small fruit, are sent, that they may be compared with the other."—T. R. ARCHER BRIGGS.

R. verticillacantha, Merat. "From Harestone, Brixton, showing a peculiar armature on the branches. The form from Warleigh is remarkable for having prickly fruit."—T. R. ARCHER BRIGGS.

R. arvensis, Linn. var. *bibracteata*, Bast. "This occurs in many spots near Plymouth."—T. R. ARCHER BRIGGS.

R. arvensis, Huds. var. Chesterton Wood, Warwick; H. BROMWICH. "A very curious form, bearing the same relation to the type that my var. *gallicoides*, from the same station, bears to typical *R. stylosa*. It is not named in Continental books, so far as I know."—J. G. BAKER.

Pyrus communis, Linn. "Hedge, between Thornbury and Common Wood, Devon."—T. R. ARCHER BRIGGS. A well-marked form which I cannot identify with any of those described by French writers. The branches are apparently not spinous, the leaves small, about an inch long, oval, acuminate, rounded at the base, finely crenate-serrate, very slightly pubescent beneath and on the margins when young, glabrous when mature. Flowers small, about $\frac{3}{4}$ inch across, in a cyme, of which the rachis is often so elongated that it becomes somewhat racemose. Calyx densely and finely woolly. Styles a little shorter than the stamens. Fruit $\frac{3}{8}$ to $\frac{1}{2}$ inch long, roundish-turbinate, abruptly narrowed into the long pedicel. I propose the name of *Briggsii* for this form if it be really destitute of a name.

P. scandica, Bab., var. *fennica*. "Glen Eisna-Vearrach, Arran; and *P. scandica*, var. *pinnatifida*. Side of rocky stream, Glen Catocal, Arran." —J. F. DUTHIE. Mr. Duthie has settled the point of there being two forms of *P. scandica* in Arran, one of which has the leaves with none of the segments separated, the other, with some of the leaves pinnate at least towards the base. All the specimens which he found in one glen belonged to the former, and all those in an adjacent glen to the other. He had an opportunity of tasting the fruit of both, and found it to be sweet. Fries thinks this the best mode of discriminating the pinnatifid variety of *Sorbus scandica* from *Sorbus fennica*, Fries, of which the fruit is acid. The Arran plant appears to be a subspecies different from that of the south-west of England, which has been sent by Mr. T. R. Archer Briggs and others.

Epilobium angustifolium, Linn. var. *brachycarpum*. "Cocken Woods, Durham."—H. E. FOX. Unfortunately there is no note to the specimen to say whether or not it has any claim to be considered native in this station.

Ribes alpinum, L. "The specimens which I send from Herefordshire are from a bush growing in a locality where it presents all the appearance of being planted or naturalized. I send also specimens from Derbyshire. I have found it in three or four different localities in the Peak of Derbyshire, growing very freely, and evidently fully naturalized, if not native." —AUGUSTIN LEY.

Saxifraga umbrosa. "The locality in Ashwood Dale, near Buxton, is at least a quarter of a mile from any house. The plant here is very luxuriant, and seems as truly wild as in any part of England."—AUGUSTIN LEY.

Caucalis latifolia, Linn. "Cornfields, near Kagushavern, Gloucestershire. Introduced."—T. B. Flower.

Picris hieracioides, Linn., var. *arvalis*. "Sychtyn Lime rocks, Shropshire."—Miss E. Jones. The specimens sent by Miss Jones show that *P. arvalis*, Jord. passes gradually into normal *P. hieracioides*. All Miss Jones's specimens are taller, more slender, and with less spreading branches than *P. hieracioides* as it grows on the chalk of the S.E. of England, and a few of them have the subumbellate inflorescence which marks Jordan's plant; but in by far the greater number the branches which bear the anthodes do not spring mostly from one point.

Hieracium pedunculatum, Wallroth. Railway bank, at Inverleith, Edinburgh. Mr. Sadler sends a few specimens of this plant under the name of *H. stoloniflorum*, W. and K. I have not access to Waldstein and Kitaibel's work;* but it is certainly not the *H. stoloniflorum* of Fries' 'Epicrisis.' Of the latter I possess specimens collected at Frankfort-on-the-Oder, sent me by the late Herr Buek. Fries quotes '*H. pedunculare*,' Wallr., as a variety of *H. Pilosella;* but as he quotes the same page of the Sched. Crit. (406) as that on which Wallroth gives his *H. pedunculatum*, no doubt Fries means to put *H. pedunculatum* as a variety of *H. Pilosella*. Whether it be a variety or subspecies remains to be proved by raising the plant from seed.

Hieracium dubium, Linn. Dr. Roy sends a specimen of a Hieracium which was noticed several years ago, by the Rev. James Keith, of Forres, on a piece of waste ground near that town. I believe it to be the plant formerly named by Fries, *H. collinum*, but which he now considers to be the true *H. dubium* of Linnæus. The periclines of the only Forres specimen I have seen are smaller, the peduncles longer, and the leaves on the stolons less developed than in the ordinary form of the Scandinavian *H. dubium;* but Fries states that it is even more protean and polymorphous than the very variable *H. prœaltum*, which it replaces in colder countries. I cannot, therefore, speak with certainty as to the name of the Forres plant until I have seen a series of specimens.

H. Borreri, Syme. Cultivated in Balmuto Garden. The root originally from Mr. Borrer, through Mr. H. C. Watson. It is probably the *H. perfoliatum*, Frölich, though I have a specimen named '*H. Grenieri*, Fries,' collected at Freiburg by Dr. Lagger, and sent me last year by Dr. Huter, which comes very near it, though it is more hairy, and with larger and fewer anthodes. *H. Grenieri* is not described by Fries in his 'Epicrisis Hieraciorum;' but he proposes the name for a plant intermediate between *H. cydoniifolium*, Vill., and *H. prenanthoides*, Vill. Dr. Hooker, in the 'Student's Flora,' quotes my *H. Borreri* as a synonym of *H. strictum*, with which it has no affinity. Probably this is a clerical error in the position of the synonym, which ought to have been placed under *prenanthoides*.

H. strictum, Fries. Banks of the Devon between the Crook of Devon and Rumbling Bridge, Kinross. It occurs very sparingly on rocks by the river-side; and as the plant seems to be very local, I have thought it advisable to mention this station, although it has been long known in two others in the neighbourhood, viz. Glendevon, Perthshire, and Lethans Dene, Fife.

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* The plant from the railway bank, at Granton, Edinburgh, collected by Mr. Sadler, in 1869, certainly agrees with Waldstein and Kitaibel's beautiful figure of *H. stoloniflorum*.—H. Trimen.

Borkhausia fœtida, DC. "Railway banks, Bathampton, near Bath, Somerset." T. B. Flower.—New to the province, but the designation "railway banks" suggests a suspicion that it is not native. The county of Hereford, given in the third edition of 'English Botany,' should probably be expunged. It was entered on the faith of a specimen received from the Botanical Society of Edinburgh, with the label "Near Reading, Herefordshire, W. M'Ivor." As I can hear of no Reading in Herefordshire, it was probably collected near Reading, Berkshire.

Centaurea Jacea, Linn. (*C. Duboisii*, Bor.). "Three plants were found amongst *C. nigra*, Yarrow and Broom in Kew pleasure-ground, near the lake, Surrey."—J. G. Baker.

Doronicum Pardalianches, Linn. Right bank of the Devon, below the Crook, Perthshire. It grows in the greatest profusion for nearly a quarter of a mile along the river-side, being far more plentiful than in any other locality in which I have seen it.—J. Boswell Syme.

Cuscuta Trifolii, Bab. "Clover fields near Seggieden, Perth." H. M. Drummond Hay.—Colonel Drummond Hay states that this is the first season in which he has noticed the Dodder "in this immediate neighbourhood." Last year I observed it in a clover-field between Kirkcaldy and Kinghorn.

Verbascum phlomoides, L. (?). "Near Buxton, Derbyshire."—Augustin Ley.

Mentha rubra, Sm. "Roadside, near Ecclesfield, Yorkshire."—W. Carr.

Pinguicula grandiflora, Lam. "Marsh near Penzance, Cornwall. Introduced, but quite established."—H. M. Drummond Hay.

Chenopodium rubrum, Linn., var. *pseudo-botryoides*. "Shore of Kinghorn Loch, Fife."—J. Boswell Syme. In the utmost profusion on the banks of the loch, below the winter level of the water, in a situation quite similar to that in which I have collected it, with Mr. H. C. Watson, in Surrey. This is the more curious, as I have not met with the normal form of *C. rubrum* in Fife, except as a weed in my own garden, into which it was no doubt introduced by seeds adhering to the roots of plants brought hither from my former garden in Adelaide Road, London.

Rumex Hydrolapathum, Huds. "Banks of the Tay, at Elcho Castle, Perth."—H. M. Drummond Hay. A very scarce plant in Scotland, the occurrence of which, in the county of Perth, required to be substantiated. There can now be no doubt that the plant grows there, and the only question that remains is, whether it be indigenous, the banks of the Tay producing so vast a number of aliens that suspicion is sometimes cast on plants which are true natives of the locality.

Rumex conspersus, Hartm. "Banks of the Devon, above and below the Crook, Kinross and Perth."—J. Boswell Syme. In the utmost profusion, even more abundant than *R. obtusifolius*, and much more so than *R. domesticus*, so that it can scarcely be a hybrid between these two species. In this locality it seeds profusely, and I have at present numbers of young plants raised from these seeds. It may be recognized at a distance from *R. obtusifolius* by being taller (generally 3 or 4 feet high) and by the branches being more upright, though the panicle is not at all dense like that of *R. domesticus*, which, in this station, is rarely above 1 foot or 18 inches high.

Rumex? "Crook of Devon, Kinross and Perth."—J. BOSWELL SYME. I have sent a few specimens of a *Rumex* which is a puzzle to me. It grows in the same stations as *R. conspersus*, but is less abundant. The stems are 18 inches to 3 feet high; the root leaves narrowly oblong, scarcely cordate at the base, and subacute; the panicle is very similar to that of *R. obtusifolius*, but the enlarged petals, which are of a brilliant red, are smaller, more deltoid, and with shorter teeth. It seems intermediate between *R. obtusifolius* and the supposed hybrid sent by me last year.

Asarum europæum (L.). "Deerfold Forest, Herefordshire. The specimens are from the locality communicated to Mr. Britten by Dr. Bull, and mentioned in the 'Journal of Botany' for 1870, p. 161."—AUGUSTIN LEY.

Euphorbia Lathyris. "The locality, at Breinton, Herefordshire, for this plant is the side of a steep wooded bank, where it has been fully established for some years, and has the appearance of being natural. There are, however, gardens and houses within a short distance."—AUGUSTIN LEY.

Narcissus major, Curt. "Thickets, Penygraig rocks, Glyn, Llangollen, Denbighshire."—ELIZABETH JONES.

Allium carinatum, Linn., Fries, *non* Smith. Banks of the Tay below Perth (FRED. STRATTON and J. BOSWELL SYME); and banks of the Tay at Seggieden, Perth.—H. M. DRUMMOND HAY. The plant grows in the greatest profusion along the banks of the Tay, especially a little above the first turnpike-gate on the Dundee Road, more than a mile below Perth Bridge. Seggieden, from whence specimens are sent by Colonel Drummond Hay, is, I believe, about three miles below Perth Bridge. The plant is certainly well naturalized on the banks of the Tay, if it be not native. Dr Hooker, in the 'Student's Flora,' admits it as a native, on the faith of the Newark station, where, however, it appears to be confined to a single patch.

Allium paradoxum, Don. "Bienny Crag, Linlithgowshire. In very large quantity, and has spread very much within the last few years."—A. CRAIG CHRISTIE.

Maianthemum bifolium, DC. "Wood, Linlithgowshire. Probably introduced, but if so it must have been a long time ago, as it is well established, and in quantity."—A. CRAIG CHRISTIE.

Butomus umbellatus, Linn. "Abundant in a tidal marsh on the Tay, about four miles below Perth."—JOHN SIM. Mr. Sim states that it was discovered in this station in 1869, by Colonel Drummond Hay. In the April number of the 'Scottish Naturalist,' p. 59, Dr. Buchanan White suggests that it is "possibly a colony from Loch Cluny, where the *Butomus* occurs as an introduced plant."

Potamogeton nitens, Weber. A specimen sent by Dr. Roy adhering to living plants of *Carex Watsoni*, from the river Don, Aberdeenshire.

Juncus biglumis, Linn. "Isle of Skye, Inverness-shire."—M. A. LAWSON. Professor Lawson is the first botanist who has found this plant in the west of Scotland.

Scirpus uniglumis, Link. "Sandhills near Deal, Kent."—J. F. DUTHIE. New to province 3.

S. parvulus, Röm. and Schultes. "Near Studland, Dorset."—J. C. MANSEL (Journ. of Bot. VIII. p. 290). Mr. H. C. Watson sends some specimens collected by Mr. Mansel in this station.

Carex arenaria, Linn. "Sandy ground near Frensham, Surrey."—H. C. Watson. These inland specimens are quite similar to the maritime ones, and show no tendency to become *C. disticha*, Huds., which Mr. Bentham considers merely "an inland variety of *C. arenaria*."

C. aquatilis, Wahl.?, var. *Watsoni*. "River Don, at Dyce, Aberdeen."—J. Roy. Dr. Roy has been good enough to send living specimens of the *Carex* supposed to be *C. acuta*, which grows in the river Don, near Aberdeen. As I expected, it proves to be *C. Watsoni*. The leaves are narrower and much more glaucous than in the alpine form of *C. aquatilis*, the stems 2 to 3 feet high. Dr. Hooker, in the 'Student's Flora,' inadvertently quotes my var. *Watsoni* as a synonym of Dr. Boott's "var. 2, minor," instead of under "var. 1, *aquatilis* proper," under which, I suppose, it ought to be, though the stem can scarcely be described as "scaberulous above."

Carex flava, var. *lepidocarpa*. "Orrock Hill, Fife."—J. Boswell Syme. I collected a few specimens of this plant, but not nearly enough to satisfy the demands for it. This can only be from the plant not being properly known. I am confirmed in this opinion by some remarks by a botanist so well acquainted with Carices as Mr. Sidebotham at the Literary and Philosophical Society of Manchester, where he remarks that in *C. lepidocarpa* the fruit is "pale green, or yellowish-green, and the beak straight." There is no perceptible difference in the colour of the fruit of *C. lepidocarpa* and *C. flava genuina* when examined in the same stage of ripeness. They both commence with being green and end with being brownish-yellow, and the beak of *C. lepidocarpa* is always deflexed, though not so much so as in the genuine form. Mr. Sidebotham's remarks respecting *C. lepidocarpa* would rather apply to *C. Œderi*. *C. Œderi* has no special partiality for the coast, either in England or Scotland; this is in answer to a query put in the April number of the 'Journal of Botany.' (Vol. V. p. 127).

C. punctata, Gaud. "Co. Cork."—I. Carroll. Mr. A. G. More has sent a specimen of the veritable plant, so that the ? given after Ireland, in the third edition of 'English Botany,' vol. x. p. 151, must be expunged.

Alopecurus fulvus, Sm. "The locality from which the specimen was gathered was discovered by Rev. W. H. Purchas in 1869; the plant is new to Herefordshire."—A. Ley.

Agrostis setacea, Curtis. "Sparingly on Woking Heath, between the Woking Station and the Dramatic College; confirming the grass to the county of Surrey, although in a different part of it from the old and doubted localities."—H. C. Watson.

Aira uliginosa, Weihe. "Swampy hollows, nearly dry in July, on Woking Heath, Surrey; one of them about a quarter of a mile southward from the Dramatic College, the other about the like distance nearer to Woking Station. It may shortly become extinct in both, through the progress of enclosure and drainage. Some specimens were dried for distribution, as better showing the tufted growth than did those brought from Fleet Pond, Hampshire, in 1869, two months later in the season."—H. C. Watson. "Still occurs at Loch of Park, and in profusion near Loch Connor, between Aboyne and Ballater; indeed I have a suspicion now that it is abundant in the interior of this district, but at present I can speak with certainty as to these two localities only. The altitude of Loch Connor is 600 feet."—J. Roy.

Avena strigosa, Schreb. "Rather common in oatfields about Plymouth, but always looking as if sown with the crop."—T. R. ARCHER BRIGGS.

Festuca ambigua, Le Gall. St. Helen's Spit, Isle of Wight, June 7, 1870. Mr. Stratton has sent a very large supply of this curious *Vulpia*, collected by Mrs. Stratton. The specimens have a wonderful similarity in habit, which is quite that of *Festuca uniglumis*, except that the florets are but half the size, although in everything but the disposition of the spikelets in the panicle it can scarcely be distinguished from *F. Pseudomyurus*. It is strange that the plant has not yet been detected in any station but the above, in which it was first discriminated by Mr. A. G. More, about ten years ago. On the Continent it seems equally rare or little known, as it is recorded only in a few places in the north-west of France, on the coast of Morbihan.

Asplenium septentrionale, Hull. "Rocks at Porlock, Somerset."—MARY EDMUNDS. The occurrence of this plant in Somersetshire is doubted in the Supplement to the 'Cybele Britannica,' though it is acknowledged as a native of Devon. In the third volume of the 'Cybele' itself, the question is raised, whether it occurs in Devon or Somerset, or in both.

Ophioglossum vulgatum, Linn. var. *ambiguum*. "Elevated sandy ground, St. Agnes, Scilly Isles, 1863."—F. TOWNSEND. It is seventeen years since I detected this curious little form of *Ophioglossum* in the Orkney Islands, in the parish of Orphir, Mainland, Orkney. I am not aware that it has been found elsewhere in Britain, except in the Scilly Isles, by Mr. Townsend. On the Continent it has been noticed in a few places in France, near Paris; and also near the Tower of Pocauçy, near Lardy, and at Cape Farret, near Arcachon. The habit of the smaller specimens of the Orkney plant is extremely similar to that of *O. lusitanicum*, while others from the same station are scarcely distinguishable from normal *O. vulgatum*. Mr. Townsend's specimens are a little larger than the smallest of those from Orkney. A small form of *O. vulgatum*, collected by Mr. A. G. More, at Garryland, co. Galway, comes very near this in point of size, but the barren frond is broadest near the base, and the accessory root-frond of var. *ambiguum* is absent, at least in the specimens which he has communicated to me.

J. BOSWELL SYME.

April 8th, 1871.

Proceedings of Societies.

DUBLIN.

NATURAL HISTORY SOCIETY, *March* 1.—Rev. Professor Haughton, F.R.S., in the chair. A paper by Mr. G. H. Kinahan, Geological Survey, was read, "On Ferns observed in Iar, or West Connaught, the part of county Galway that lies west of Loughs Mask and Corrib, with localities of a few rare Ferns in S.W. Sligo." The most important observation was the detection of *Adiantum Capillus-Veneris*, L., five miles from the east end of the Killery Harbour, on the hill N.N.E. of Sheffey, county Mayo, a point intermediate between the Sligo and the Urrisbeg and Arran localities. Only a few small stools could be found. The lobes of the pinnules are very deeply serrated

April.—R. P. Williams, Esq., Vice-President in the chair. "Notes on *Hymenophylla*, especially with reference to New Zealand Species," by Mr. W. Andrews. In the course of the paper, the following remarks were incidentally made on the two British species :—It has often much surprised me that British botanists are so persistent in making *H. unilaterale* the true representative of *H. Wilsoni*, for I venture to assert that few have ever possessed truly authenticated specimens of *H. unilaterale* of Willdenow and of Bory St. Vincent, and none to have seen living specimens. *H. unilaterale* seems altogether to be confined to the Island of Bourbon, where alone it was met with and described by Bory St. Vincent. Of *H. unilaterale* of New Zealand, the spreading frond more nearly approaches *H. tunbridgense*, but the fruit, with even and entire involucres, is similar to that of *H. Wilsoni*, with the exception that the lips of the involucre are broader and not ovate. I have been favoured with a specimen of the true *H. unilaterale* from Réunion, obtained by Dr. Meller. It unfortunately has no involucres, yet the character of the pinnules of the frond are distinct both from *H. tunbridgense* and *H. Wilsoni*. I expect better specimens. In the meantime, I will give the account of one who has taken much interest in the study of Ferns, especially those of the Mauritius, from which place the communication is sent. The extract, which is very clear and pleasingly written, is from a letter sent to a lady in this city, who is much interested in the subject :—"*Hymenophyllum unilaterale* does not grow in Mauritius, but in the neighbouring Island of Bourbon (Réunion), and none has been found there since 1835, so that there was some difficulty in procuring a specimen. This, however, has been managed with the aid of Dr. Meller, the Director of the Botanic Gardens here, who was in Réunion when your letter arrived, and who succeeded in getting me an authentic specimen, named by Bory St. Vincent himself, which I now send to you, together with a few of our Mauritius *Hymenophylleæ* and *Trichomanes*, as they may interest you or your friends. Sir Henry (Barkly) and myself, in concert with Dr. Meller, carefully examined *H. unilaterale*, and we came to the conclusion that it decidedly differs from the description given of *H. Wilsoni* by Hooker in his 'Species Filicum,' i. 95, inasmuch as its margin is perfectly smooth except just at the apex of the segments, while the latter is described as having the margin "toothed or spinuloso-serrate." The cells, too, which Dr. Meller examined with a microscope, are sufficiently distinct from those of *H. Wilsoni*, as figured in Seemann's 'Journal of Botany,' I. 294. It also appears to differ widely from the description given of *H. tunbridgense*, to which Sir William Hooker referred a specimen of *H. unilaterale*, sent by Willdenow (*vide* 'Species Filicum'). We have not yet found *H. tunbridgense* in Mauritius, and can only judge from some specimens from Ireland, and from a figure given in Beddome's 'Ferns of Southern India.' There can be little doubt therefore that *H. Wilsoni* is a distinct species, though whether the same honour can be given to *H. unilaterale*, or whether it is only a peculiar form of some of the Bourbon varieties, remains to be proved. Sir Henry and Dr. Meller both incline, I think, to the latter opinion, as several of the *Hymenophylleæ* from Réunion have a decided tendency to a unilateral character, and I enclose one specimen of *H. Boryanum* found by Dr. Meller growing with a mass of that Fern and from the same root, which you will see is scarcely distinguishable from *H. unilaterale*." Mr. F. Clowes, of Windermere, who has made several communications to me on the subject, states that the fronds of *H. tunbridgense* die annually, while those of *H. Wilsoni* grow on from year to year. This I can confirm by observations on their growth in my own fernery. In the extract I have given it is stated that *H. Boryanum* is scarcely distinguishable from *H. unilaterale*. The venation of this little Fern is similar to that of *H. tunbridgense*, but differs in the hairy underneath part of the frond, and in the branched hairs at the margins. The involucres are orbicular, ciliated, and sunk in the frond. I have had much correspondence with my friend Mr. Wilson regarding the interest of the species that he has described; and from my extensive examinations of those Ferns in all seasons and localities in this country, I am more than ever confirmed in the truly distinctive characters of *H. Wilsoni*, and that no British nor foreign botanist had ever before described it. This leads me to observe on the subject of discovery, that Dr. Graves, it would appear, first found and noticed *H. Wilsoni*, but did not even guess that there were two species existing in Britain. Therefore to Mr. Wilson, who distinguished and described the plant, is eminently and justly due the discovery.

DUBLIN SCIENTIFIC CLUB, *March 6th.*—Dr. R. Macdonnell, F.R.S., who was in the chair, communicated some observations "On the Colours of Flowers Grown in Darkness." He grew Hyacinths of the three primary colours in a perfectly dark cellar. The green leaves were completely etiolated, while the flowers of the red variety were quite white, those of the yellow practically so, but the violet-blue were unaffected.

ROYAL DUBLIN SOCIETY, *March 20th.*—Professor Ball in the chair. Dr. Moore, Director of the Botanic Gardens, Glasnevin, made a communication relative to the loss of the fine plant of *Pandanus utilis*, Bory, which had until recently been one of the most conspicuous ornaments of the palm-house. Dr. Moore had personally had the plant under his care for thirty-three years, and it was certainly not less than twenty years old when he first knew it. It was about twenty-five feet in height, and had reached a size at which its flowering might be looked forward to with some certainty. All such hopes were, however, frustrated by the fungoid disease to which the plant eventually succumbed. This first showed its effects in the stem immediately beneath one of the crowns, destroying the rigidity and cohesion of the tissues, so that the crown drooped downwards. The crown was removed, and an attempt made to propagate it, but the external symptoms of disease which the plant exhibited were only too evidently the final result of the not immediately apparent internal ravages of a mycelium, and the crown, like the rest of the plant, was already doomed. Successive portions of the different axes were amputated, but without, in any way, averting the mischief. Dr. Moore stated that the fungus was identical with that which had destroyed the *Pandanus odoratissimus*, Jacq., in the gardens at Breslau, and of which there was an account in Cohn's 'Beiträge' by Dr. Schrœter. The diseased parts of the plant exhibited several fungoid forms, which there was good reason to believe were polymorphic states of the same plant; of these *Melanconium Pandani*, Lev., and *Nectria Pandani*, Tul., had been described.* Dr. Moore stated that there was no reason to attribute the death of the

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* An abstract of Dr. Schrœter's paper by Mr. Currey is contained in 'Nature' for January 26, 1871, p. 243.

Pandanus to drip or chill, as all the other plants in the same house were remarkably healthy. He feared that considerable exchanges having been made with Continental Botanic Gardens, the germs of the disease had been imported from thence. Dr. Moore also called attention to the flowering at Glasnevin, he believed, for the first time, in Ireland, of *Selenipedium* (*Cypripedium*, Lindl.) *caudatum*, Reichb. The lateral petals grew after the flower expanded in a few days to the length of nearly two feet. The gardens possessed a plant of *Uropedium Lindenii*, Lindl., in which the labellum also was represented by a long slender tail, but there was not at present any likelihood of its flowering.* Professor Thiselton Dyer made some remarks on the incorrect statements current in text-books with reference to the germination of seeds. He pointed out that the endorhizal radication of Grasses is a necessary result of the remarkable modification of the caulicle (radicle). This forms by its lateral enlargement the so-called cotyledon (scutellum). The key to its homology is supplied by the embryo of *Zostera* as pointed out by Mr. Clarke and Professor Dickson.

Botanical News.

In the recently-published first part of the twenty-first volume of the Memoirs of the Société de Physique et d'Histoire Naturelle de Genève, Dr. Duby has described and figured the new species of Acrocarpous Mosses collected by Dr. Welwitsch during his travels in Portuguese west tropical Africa, chiefly in the highlands of Angola and Benguella. The species are twenty-two in number, as follows:—*Sphagnum africanum*, *Polytrichum (Pogonatum) huillense* (wrongly given as *angolense* in the text, but correct on the plate), *P. elegans*, *Bryum viriaescens*, *B. spongiosum*, *B. (Brachymenium) angolense*, *B. (Br.) Welwitschii*, *B. huillense*, *Campylopus scinroideus*, *C. montanus*, *C. æthiops*, *C. horridus*, *Fissidens Welwitschii*, *F. macrophyllus*, *F. glaucissimus*, *F. dasyphus*, *F. longipes*, *F. angolensis*, *Pottia compacta*, *P. gymnostomoides*, *Trematodon intermedium*, *T. angolense*. The figures, which are drawn by the author, who had the assistance derived from Dr. Welwitsch's notes and sketches, are complete and appear to be executed with great accuracy. The *Pleurocarpi* will, it is intended, form the subject of a second communication.

Mr. Munroe, of Pennsylvania, on a botanical expedition to inspect and report on West Indian fruits, has announced that Jamaica presents the largest collection and variety of tropical fruits to be found in any one district between Brazil and Mexico. Mr. Munroe has been well received by the Government Botanist, and engrafted a variety of Mangoes, an operation hitherto unsuccessful in Jamaica though successful in Bengal.

Under the title 'Georgika,' Professor Karl Birnbaum has started at Leipzig a new monthly periodical (price 12 shillings per annum), devoted to agriculture and kindred sciences, the first number of which, published January, 1871, contains a paper on "Wars in the Vegetable Kingdom," by Prof. H. Hoffmann, of Giessen, giving an account of his observations on the struggles for existence going on in fields where free play is left to weeds on cultivated ground. The paper is a valuable contribution to the weed question, though the author is not familiar with its latest phases, and we may be tempted to transfer at least portions of it to our pages.

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* Figures of these plants will be found in the 'Flore des Serres,' vol. vi. pl. 566, and p. 123.

Of Dr. F. von Mueller's esteemed Fragmenta Phytogr. Austr. no. lv. has just reached us, containing descriptions of *Motherwellia* (gen. nov. *Araliacearum*), *Amorphospermum* (gen. nov. *Sapotacearum*), and *Niemeyera* (gen. nov. *Sapotacearum*). The Australasian *Typhas*, which were hitherto held to be identical with our European *T. angustifolia*, are distinguished as *T. Brownii*, Kth. (*T. latifolia*, Forst., *T. angustifolia*, R. Br.), and *T. Muelleri*, Rohrb. (*T. Shuttleworthii*, Lehm., *T. angustifolia*, Hook. f. in Fl. Tas.).

Professor J. Hanstein, of Bonn, is issuing a series of morphological and physiological papers, published by A. Marcus, of Bonn, under the title of 'Botanische Abhandlungen.' The first number contains a paper by Professor Hanstein himself, on the development of the embryo of Monocotyledons and Dicotyledons; whilst the second, just out, is devoted to a treatise on the structure and development of *Bacillariaceæ* (*Diatomaceæ*), and from the pen of Dr. E. Pfitzer. The latter is illustrated by six excellent coloured plates.

The first number of Professor Cohn's 'Contributions to the Biology of Plants' (Beiträge zur Biologie der Pflanzen), though dispatched in September last, has only reached us in April, 1871, containing articles by Schroeter, Lebert, and Cohn, of permanent value, and relating to the part played by certain Algæ and Fungi in decomposition and disease. The paper on "*Crenothrix polyspora* and the Microscopic Analysis of Well-waters," should be widely studied, and follows up the researches of Hassall (1850) and Radlkofer (1864).

A series of portraits of noteworthy horticulturists and botanists is being published in the 'Gardeners' Chronicle and Agricultural Gazette.' The following have already appeared, Dr. Hooker, C.B., F.R.S.; W. Wilson Saunders, F.R.S.; Rev. M. J. Berkeley, F.L.S.; M. Decaisne, G. F. Wilson, F.R.S., and Professor Reichenbach, of Hamburg.

The first part of the fourth volume of the Danish 'Botanisk Tidsskrift,' recently published, contains a complete catalogue of the plants of the Faroë Islands, with an introduction and critical notes. The author is Mr. E. Rostrup, who, with Mr. C. A. Feilberg, spent the summer of 1867, collecting in the group. Of flowering plants and Ferns the catalogue contains about 360 species, besides many varieties; complete lists are also given of the lower Cryptogams. The flora of these small islands possesses a great interest for students of our native plants, because, although not dependent on the English Crown, the Faroë isles must be considered geographically as part of the archipelago of which Great Britain and Ireland are the largest members. The accident, so to speak, of political relationships should not be allowed to override physical ones, and it would be more fitting that British Floras should include the score or so of species which these islands add to our list, than that their consistency should be destroyed by the admission of thirty or more species absent from Great Britain and Ireland, but found in the Channel Islands, the vegetation of which is that of Western Continental Europe.

Mr. T. Moore will deliver a course of six lectures on Botany, illustrated by fresh specimens, at the garden of the Apothecaries' Society, Chelsea, every Wednesday and Saturday at four P.M., from Wednesday May 31st to Saturday June 17th. The course is intended for members of the medical profession and medical students.

Mr. Britten, who hopes shortly to publish his paper on the Flora of Berks, will be glad to receive, as soon as possible, any information on the subject.

The Eastbourne (Sussex) Natural History Society has published a provisional list of the fauna and flora of the small district over which their investigations extend. No less than 517 Phanerogams are enumerated, and 459 Cryptogams, which shows conclusively that the members of the society have not been idle since its formation in 1867.

Our readers will be glad to see that our valued correspondent, Mr. W. Carruthers, Keeper of the Botanical Department of the British Museum, is one of the fifteen candidates selected by the Council of the Royal Society, and recommended to the Society for election as Fellows of that learned body.

James Yates, Esq., F.R.S., of Highgate, who died on May 7th, was well known amongst botanists and horticulturists for his fine collection of living *Cycadeæ*, in which Order he took a great interest, and to the knowledge of which, in this country, his series has considerably contributed. His extensive herbarium of dried specimens of these singular plants, he, a few years ago, presented to the British Museum.

The Swedish Arctic Expedition has started, and will visit during this summer the waters and shores of Baffin's Bay, etc. Mr. Thore Fries accompanies it as botanist, and Messrs. J. Lindahl and Nauckhoff as zoologist and geologist. The expedition, which consists of two vessels, is expected to return to Sweden early in October.

We notice, with pleasure, the appearance of the first two numbers of the new 'Botaniska Notiser,' at Lund, edited by Otto Nordstedt. Each number will contain thirty-two pages, and it is intended that seven shall be published annually. Special attention is paid to Scandinavian botany, and a complete review is given of all botanical papers published in Sweden, Norway, Denmark, and Finland. The subscription, payable at any Scandinavian post-office or bookseller's, is 3*s*. 4*d*. per annum.

The first fasciculus of Nordstedt and Wahlstedt's 'Characeæ Scandinaviæ exsiccatæ' is, we learn from the above-mentioned journal, just published. It contains forty forms, and the price is 16*s*. 8*d*. Two more fasciculi, at the same price, will complete the series. Application may be made to Mr. Otto Nordstedt, Lund, Sweden.

'Nature' says that the vacancy in the curatorship of the Botanic Garden at Utrecht, caused by the death of Professor Miquel, has been filled by the appointment of Dr. N. W. P. Rauwenhoff.

The only botanical paper in the recently-published part (vol. xxvii. part 3) of the Linnean Society's Transactions, is Dr. Lauder Lindsay's observations on the Lichens collected by Dr. Brown in Greenland, during Mr. Whymper's expedition in 1867.

CORRIGENDA.—P. 91: Mr. A. Ernst writes to say, that it is the seeds themselves of Sabadilla that are exported from Caracas, and also that the plant was previously known to occur out of Mexico; p. 156, l. 7, *for* "Familiar" *read* Tamil.

COMMUNICATIONS have been received from Prof. A. Dickson, Prof. A. H. Church, Dr. Welwitsch, Dr. J. E. Gray, Dr. Boswell Syme, Rev. A. Ley, W. Carruthers, A. G. More, F. Stratton, W. W. Reeves, R. Tucker, E. F. im Thurn, A. Ernst, W. Phillips, A. W. Bennett, etc.

Original Articles.

ON *BRASSICA POLYMORPHA*, *Syme*.

By W. T. Thiselton Dyer, B.A., B.Sc.

In two papers in this Journal (vii. 346–350; viii. 369–372) Mr. H. C. Watson has described a *Brassica* which occurs by the Thames-side in Surrey and Middlesex, and which he believes to be *B. campestris*, L.; understanding by that name the "wild stock of the Turnip." In the 'Flora of Middlesex' (p. 35) this plant was erroneously placed under *B. Napus*, L.; an error which arose from Dr. Trimen and myself having, in the absence of such opportunities as Mr. Watson possesses of examining the winter-tufts, followed Dr. Boswell Syme, who had recorded under that name plants from the Thames-side. Mr. Watson has, however, abundantly demonstrated that the Thames-side *Brassica* is perfectly distinct from *B. Napus*, and that it is in fact what, adopting the characters given by De Candolle (Syst. Nat.), Smith (Eng. Fl.), Boswell Syme, (Eng. Bot.), Hooker (Stud. Fl.), and Boreau (Fl. du Cent. de la Fr.), would be called a wild state of *B. Rapa*, L.

A perfectly distinct question, therefore, from the identity of the Thames-side species is raised by Mr. Watson with respect to the synonymy of the other plants allied to it. Hitherto, most systematic books in this country have included three allied species of *Brassica* admitting of being distinguished by characters drawn from their radical leaves. Using the language of De Candolle (Reg. Veg. Syst. Nat. ii. 588–592), these characters may be stated as follows:—

B. campestris, foliis polline glaucis inferioribus novellis subhispidis.

B. Rapa, foliis radicalibus lyratis polline glauco destitutis setoso-scabris.

B. Napus, foliis glabris polline cæsio glaucescentibus.

Substantially the same characters are given by Smith (Eng. Fl. iii. 217, 218); who, however, also describes *campestris* as having radical leaves, only "*rather* glaucous, rough *all over* with minute bristly hairs' (p. 219), which looks as if he were not wholly free from some confusion between this plant and his *Rapa*. Lindley ('Synopsis') merely quotes Smith. Sir W. Hooker (Brit. Fl. 308) refers to Smith, and has the same arrangement, but does not mention the green radical leaves of *B. Rapa*, distinguishing it from *B. campestris* by its fleshy root instead. Boreau gives the same characters as De Candolle.

The nomenclature of probably all modern English writers, who have treated of the economic aspect of these plants, is borrowed from De Candolle's determinations. Unless on very urgent grounds, it would be hardly desirable to alter this. The reform, unfortunately, of scientific terms which have got into popular use rarely has any other effect than to make both old and new ambiguous and useless. The old and erroneous meanings continue to survive alongside with the new and correct ones. It is always best, when popular use has spoiled a term, to leave it to its fate, accept it in its erroneous sense, and, if necessary, invent a new word to do its proper work.

Of each of the three cultivated species of *Brassica* De Candolle describes two forms; one, annual, with a slender root and rapid production of seeds, lending itself to the purposes of the oil-expresser; the other, biennial, with a root which is enlarged and esculent. Probably, a succulent-rooted variety of almost any plant with anything like a biennial habit, might be obtained by patient cultivation and selection. Turnip-rooted forms of Chervil (*Anthriscus Cerefolium*, Hoffm.) and Parsley (*Petroselinum sativum*, Hoffm.) may be bought in the shops; even the wild Radish (*Raphanus Raphanistrum*, L.) has been made in France, as a matter of experiment, to yield an esculent root. Generally speaking, a generous supply of food tends to develope the leafy or nutritive organs of such plants, and checks the evolution of the reproductive organs—or, what is in biennials practically the same thing, the growth of the ascending axis. Hence these plants when stinted in their food, as when growing amongst standing crops, rapidly run up and attain maturity; or, in other words, are apt to become annuals.

B. campestris, De Cand. (l. c. 588), includes two very important agricultural plants—the Swedish Turnip and the Rape or Colza. As far as my experience of these plants goes, they certainly are forms of the same species, only differing in the presence or absence of an enlarged root. If the mature radical leaves of either form of this plant be examined both will seem almost glabrous, and it is only by a careful scrutiny of the ribs on the under surface that a few scattered cartilaginous hairs can be detected; the young leaves are, however, quite obviously hispid. It is worth while remarking that externally there is a wide difference between the root of the Swede and the ordinary Turnip, which is well known to agriculturists. The Turnip, whether globe or tankard (*depressa* or *oblonga*) has the crown of leaves sessile without any elongation of the internodes. The Swede, which, without being oblong is straight-sided in its middle, has its upper portion prolonged into a "neck" marked by the scars, separated by partially developed internodes of the decayed lower leaves of the crown. Of the history of the Swedish Turnip (var. *Napo-Brassica*, De Cand.) almost nothing seems to be known. De Candolle remarks, that possibly it may be a hybrid between *B. campestris* (Rape) and *B. Rapa;* and Mr. Buckman states "that the seeding of Rape and common Turnips in mixed rows has resulted in the production of malformed Swedes; which, however, improved very much by careful cultivation" ('Treasury of Botany,' p. 165). Lamarck, struck probably with the character of the neck, observes that the Swede is a variety in the same race as the Chou-rave (*B. oleracea*, var. *caulo-rapa*, De Cand.), the Kohl-rabi of English seedsmen; and this would be pretty nearly the opinion of Linnæus, if, as it seems probable, De Candolle is right in quoting, as a synonym of the Swede, *B. oleracea*, var. *Napo-Brassica*, L. (Sp. 932), identified with *B. Napus*, var. γ. *esculenta* by Koch, who seems to include the hispid Rape as well as the Swede under *Napus*. One variety of the Swede has large entire cabbage-like leaves (Wilson, 'Farm Crops,' i. 275). Mr. Watson, in his second paper, remarks that "Turnip and Swede are species about as distinct from each other as Swede and Cabbage" (viii. 370). He is certainly correct in contrasting the larger and pale orange-coloured flowers of the Swede with the bright buttercup yellow of the Turnip. Hybrids permanent in their characters have been obtained between the Swede and the White Turnip, and are quoted in seedsmen's lists. It cannot be doubted that both Swede and Rape must often occur subspontaneously as the remains of cultivation; and, probably, often figure in herbaria and local lists as *B. campestris*.

B. Rapa, De Cand., the Turnip in its esculent rooted state, falls into two races, which have always been distinguished in books,—the varieties *depressa* and *oblonga* of De Candolle. Besides these, a slender-rooted form, cultivated as an oil plant in Dauphiny, was ascertained by experiment, in the Geneva Botanic Garden, to belong to this species, and must, therefore, be the same as the Thames-side *Brassica*.

B. Napus, De Cand., is probably almost unknown in this country. I have examined fields of Rape in Gloucestershire, and have always found the young leaves to be hispid. I conclude, therefore, that this could not be *Napus*. In Forster's Herbarium in the British Museum there is a young plant of, I presume, this species, as the leaves, as far as I could see, are quite glabrous. This is the only example I have come across. Mr. Watson speaks of Rape with the synonym *Napus* in his paper (viii. 271). If this is correct, which I do not think it to be, *B. Napus* ought to occur as a waif of cultivation, at any rate, in sheep-farming districts. In the 'Cybele' (i. 160), however, he says, "I have never seen—at least, never recognized—the species." It is apparently cultivated on the Continent both as an oil- and root-yielding plant. Its root, called "navet," is often confounded with the Tankard Turnip, but seems to have been generally pretty clearly distinguished (Cf. *Rapum oblongius* and *Napus*, Dod. Pempt. 673, 674). It is a common vegetable in Continental gardens, though apparently hardly, if ever, cultivated in England.

If we turn to the diagnoses of these plants given by Linnæus, while there is no difficulty in determining what is meant by his *B. Rapa* and *B. Napus*, the identity of his *B. campestris* is very uncertain; in fact, all that can be certainly stated of it is, that it was a troublesome weed in parts of Sweden. The description merely states that it had a slender root and uniform cordate sessile leaves. The synonyms given in the 'Hortus Cliffortianus' (p. 339), to which reference is made, apparently belong to either *Erysimum orientale*, Br., or *E. austriacum*, Jacq.; and Lamarck has united the former species (=*Brassica orientalis*, L.) with *B. campestris*, L., which he considers the same as *E. austriacum*, Jacq., under the name of *B. perfoliata* (Encyc. Méthod.).* Mr. Watson believes *B. campestris* to be the wild and slender-rooted form of *B. Rapa*, the same, in fact, as the Dauphiny plant of De Candolle; and he remarks that Grenier and Godron follow Lamarck in using the expressive name *asperifolia* for the aggregate species, making *campestris*, L., its type-form, and *Rapa*, L., the esculent-rooted variety. But Lamarck, in the 'Encyclopédie Méthodique' rather unintelligibly joins not *campestris*, but *Napus* to *Rapa*, notwithstanding that Linnæus states *Napus* to have glabrous leaves. Koch also (Syn. Fl. Germ. ed. 2. i. 59) considers *B. campestris*, L., to be an annual variety of *B. Rapa*, and the same as *B. præcox*, Kit.; which is puzzling, as De Candolle describes that plant as having all glabrous glaucescent leaves.

It is, of course, quite obvious that if Linnæus's *campestris* was a troublesome weed in Sweden, it could not be *Erysimum orientale*, Br.; and Koch, Babington and Watson may be right, as far as the evidence from books goes, in looking upon it as a wild state of *Rapa*. The authentic specimens, however, in the Linnæan Herbarium, although not very satisfactory, will hardly support this view. Two sheets are named "*campestris;*" the first contains a "top," and an indeterminate example of an annual plant, apparently the same as that on the second sheet. This last is about a foot in height, in flower (the inflorescence decidedly corymbose where the petals are still unfallen), yet still preserving the radical leaves. These lower leaves are only sparingly hispid, the pairs being confined to the ribs, and they are also distinctly glaucous; in fact, they appear to me quite the same in appearance as those of a young seedling Swede sent me by Mr. Watson. The young leaves of the Thames-side *Brassica* are not in the least glaucous, and are, as Mr. Watson says, "much hispid," the hairs being by no means confined to the ribs. The Smithian Herbarium yields little information, as none of the specimens have young leaves. The *campestris* of the Linnæan herbarium and of Mr. Watson appear, therefore, by no means to be the same thing. The Swedish plant seems to be nearly allied to the Swede and the Rape of English agriculturists; the Thames-side plant is indubitably a wilding Turnip. The only question remains, how is the existing nomenclature to be adjusted to our English plants. The first step would be to eliminate *B. Napus;* apparently, as far as England is concerned, a purely spectral plant, if one with wholly glabrous radical leaves is intended. Koch retains *Napus*, including under it the plants of De Candolle's *campestris*, making, as stated above, the *campestris* of Linnæus, a variety of *Rapa*. *Napus*, at any rate, has only a prescriptive right to a place in English Floras.

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* In the Herbarium (now in the British Museum) of Linnæus, containing the originals of the 'Hortus Cliffortianus,' *Brassica campestris perfoliata, flore albo*, B. P., is *B. orientalis*, L. (=*Erysimum orientale*, R. Br.), and *B. campestris perfoliata, fl. purpureo*, B. P., is *B. arvensis*, L. (=*Moricandia arvensis*, De Cand.); neither of these are Scandinavian plants. (H. T.)

As to the name '*polymorpha*,' Boswell Syme, by a curious error, says (Eng. Bot. i. 136) that he gives it to the aggregate species "in preference to *B. campestris*, as that name has been applied exclusively to the form with glabrous (not hispid) radical leaves," which is apparently the opposite of the fact. Dr. Hooker, however (' Student's Flora,' p. 29), considers that *B. polymorpha* should not supersede *B. campestris*.

The synonymy of these plants would seem to stand as follows:—

Brassica polymorpha, Boswell Syme, E. B. i. 133, non Murr.*
B. campestris, Hook. Stud. Fl. 29.
I. *B. campestris*, De Cand. Syst. ii. 588.
α. *oleifera*, De Cand.
B. campestris, L. Herb.
Rape, Colza.
β. *Napo-Brassica*, De Cand.
Swede.
II. *B. Rapa*, L. Sp. 931; De Cand.
α. *rapifera*, Koch, Syn. ed. 2. i. 59.
Turnip.
β. *campestris*, Koch, *ibid.;* Watson, l. c.
'Navew,' Watson, l. c.
[III. *B. Napus*, L. Sp. 931.
α. *oleifera*, De Cand.
β. *esculenta*, De Cand.]

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* *B. polymorpha*, Murr. and W. & K. = *Sisymbrium junceum*, Marsch. v. Bieb.

JOTTINGS FROM A BOTANICAL NOTE-BOOK.

By A. Ernst, Esq.

(*Continued from Vol. VIII. p.* 376.)

11. Coccoloba padiformis, *Meissn.* in De Cand. Prodr. xiv. 166. n. 67.—Not common in the ravine of the river Catuche. The description given by Meissner is excellent; the calyx is of a deep-red colour, the fruit is small (5 mm. long), the calyx remains membranaceous, and does not include wholly the somewhat trigonal, smooth, and brownish-black achænium.

12. Anemopægma glaucum, *Mart.;* De Cand. Prodr. ix. 188. n. 6. —A high climber, flowering in June. It appears to be not uncommon in the ravine of the river Catuche, and I have sent seeds to Kew. As Martius's description, quoted in De Candolle's 'Prodromus,' is rather short, I may add a more extensive one.—Frutex scandens, glaberrimus, lævis, ramis et petiolis communibus cortice griseo tectis, verrucose-striatis, petiolo communi subpollicari, petiolulis brevioribus viridibus; foliis bifoliatis oppositis cirrhos inter foliola gerentibus, foliolis late lanceolatis obtusis penninerviis nervulis utrinque elevatis reticulatis, punctulis crebris supra concavis, subter convexis notatis, 7–8 poll. long., 2–3 poll. lat., supra obscure viridibus, subter glaucescentibus; racemis axillaribus vel interdum terminalibus, petiolis longioribus, pedicellis pollicaribus nigro-punctatis, medio bibracteolatis, inferioribus bifloris oppositis, superioribus unifloris: calyx $\frac{1}{2}$ poll. long., campanulatus, ore truncato, sæpe lateraliter 2–3-fissus, nervorum apex denticulis minutissimis nigris notatus; corolla flava, speciosa, 2–3 poll. longa, supra calycem ampliata, tubo longissimo, lobulis 5, æstivatione quincunciali, obtusis, $\frac{1}{2}$–$\frac{3}{4}$ poll. long.; stamina 4 cum rudimento quinti, basi pilis articulatis barbata, adscendentia, supra medium incurvata, didynamia; antheræ biloculares, loculis ut in genere; stylus rectus, staminibus longior; stigma bilamellatum, lamellis subrevolutis; ovarium disco carnoso insidens, biloculare, ovula in quoque loculo biserialia; fructus capsula ovalis, pedicellata, apice obtusa, 6 poll. longa, 3–4 poll. lata, compressa, $\frac{1}{2}$ poll. crassa, lævis, cortice griseo obtecta; valvis nervum medianum secus partibilibus, septum membranaceum; semina biserialia, orbiculata, $2\frac{1}{2}$ poll. lata, 2 poll. longa, ala radiatim striata, margine lacerata, ad hilum interrupta; cotyledones carnosæ, rotundo-bilobiatæ, $\frac{3}{4}$ poll. latæ, $\frac{1}{2}$ poll. longæ, basi et apice cordatæ, radicula brevissima.

13. Esenbeckia castanocarpa, *Griseb.* in Flora of the Brit. West Indian Islands, p. 135.—Ravine of the Catuche, *passim.* Grisebach's description is a good one, but the fruits are not exactly *tubercled.* I would rather say covered by short and thick spinulæ.

14. Tephrosia toxicaria, *Pers.*—Grisebach (l. c. p. 182) is incorrect in saying that the flowers are blue. Swartz is more correct (Fl. Ind. Occid. 1279). The standard is whitish-yellow, over the claw reddish, and so are also the wings.

15. Rollinia glaucescens, *Miq.;* Walp. Ann. ii. 20.—Of this interesting plant one specimen was found in the ravine of the Catuche, where it betrayed its existence by the intense and sweet smell of its numerous flowers.

16. Jatropha urens, *Willd.;* De Cand. Prodr. xv. ii. p. 1100.—

Our form would be *J. Kunthiana*, Muell. l. c. p. 1099, but I do not think this is really a different species. It is certainly painful to get hurt by its stinging hairs. My left hand was swollen for about three days, and I felt rather feverish, though no more than five hairs had touched the back of the hand.

17. As a curious case of what has been styled *mimicry* in vegetation, I may mention *Cessaria legitima*, De Cand. (Prodr. v. 456), a shrubby plant, growing commonly on the banks of our rivulets. It is called *Sauce* (*i. e.* Willow), and is indeed so very much like the *Salix Capræa*, L., that at first sight it might be taken for it, especially when not in flower.

18. Mr. A. Goering, an ornithological traveller, who lately visited the mountains of Merida, brought with him to Caracas a small collection of alpine plants from the "Paramos." Though the specimens were badly preserved, being dried as druggists dry their herbs, I could make out the following:—*Asplenium fragile*, Kl.; *Acrostichum lepidotum*, Willd.; *Jamesonia canescens*, Hook. et Gr.; three Grasses; SEDUM BICOLOR, *H. B. K.;* OSTEOMELES GLABRATA, *H. B. K.; Baccharis microphylla*, H. B. K.; *Eupatorium*, sp.; *Hypochæris sessiliflora*, H. B. K.; *Espeletia argentea*, H. B. K.; *Cerastium*, sp.; *Euphrasia santalinæfolia*, H. B. K.; *Gentiana corymbosa*, H. B. K.; *Centropogon*, sp.; *Myrrhis (?); Hypericum juniperinum*, H. B. K.; another species, very likely *H. acerosum*, H. B. K.; *Thibaudia nitida*, H. B. K.; *Vaccinium thymifolium*, Kl.; (*Romerito*, inc.); RHACHICALLIS CARACASANA, *De Cand.; Draba cheiranthoides*, Hook. f. The few names printed in small capitals refer to plants that occur also in the mountains of Caracas; the rest, the greatest part, belongs to the flora of New Granada. The large collections made by Linden, Funk, Schlim, Moritz, and Wagner in the mountains of Mérida and Trujillo confirm this result, which is to be expected as a consequence of the geographical position. I may be allowed to add that Mr. Goering found the *Myroxylon toluiferum* near Turaras (west of Puerto Cabello), and forwarded specimens to Dan. Hanbury, Esq., of London. Dr. Seemann had noticed the tree in 1864 on the Tocuyo river.

19. TERATOLOGICAL REMARKS.—I have seen some fruits of *Persea gratissima*, Gærtn., which had no seed, containing instead of it a watery liquid. I was told that the tree they were taken from (on an estate near La Guaira) never had produced normal fruits. Fasciation occurs not seldom in the spikes of *Stachyturpha jamaicensis;* syncarpy is not unfrequent in *Musa sapientum. Hippocratea comosa* is an example of the complete suppression of the flower (comp. Masters, 'Teratology,' p. 409). An instance of the fission of stamens came lately under my notice; one of the stamens in *Crinum amabile* was nearly wholly divided in two. The case of pleiotaxy of the gynœcium in the *orange*, mentioned by Masters (l. c. p. 389), is pretty common here. The people call these fruits "naranjas paridas," *i. e.* oranges lately delivered.

(*To be continued.*)

NOTES IN JERSEY AND GUERNSEY.

By HENRY TRIMEN, M.B., F.L.S.

I spent the last week of April, 1871, in the Channel Islands, four days in Jersey and two in Guernsey, having the advantage of Mr. F. Stratton's companionship in the former island; and have put together my jottings about some of the more interesting members of the flora, in the belief that few British botanists have examined the spring vegetation.

At this season, the botany of the tracts of sandy ground near the sea best repays attention. It consists of a dwarf vegetation of numerous species, and great beauty. The prevalent species in flower in such places during my visit to Jersey were *Cochlearia danica*, *Mœnchia erecta*, *Sagina apetala vera*, *Arenaria serpyllifolia vera*, *Cerastium semidecandrum*, *Ornithopus perpusillus*, *Alchemilla arvensis*, *Saxifraga tridactylites*, *Valerianella olitoria* and *V. carinata*, *Myosotis collina*, *Plantago Coronopus*, *Carex arenaria*, and a maritime state of *Bromus mollis*, all of very small size. These formed the bulk of the close turf; but scarcely less abundant were *Capsella Bursa-pastoris*, *Teesdalia nudicaulis*, *Arabis Thaliana*, *Draba verna majuscula*, *Stellaria Boræana*, *Erodium cicutarium*, *Trifolium subterraneum* and *T. minus*, *Vicia angustifolia* and *V. lathyroides*, *Myosotis versicolor*, *Phleum arenarium* and *Mibora minima*, the last varying considerably in size and in the colour of the glumes. Equally common was a dwarf Pansy, which agrees well with the description of *V. nemausensis*, Jord. in Boreau's Fl. du Centre, p. 83, and with Billot's specimens so named, from La Rochelle (n. 1127 ter). This seems to be the *V. tricolor*, var. γ. *mediterranea*, of Gren. and Godr. i. 183, and is certainly the var. θ. *nana* of Lloyd's Fl. de l'Ouest, p. 70. The petals are pale bluish-white, a little shorter than the sepals, and the spur blue. A *Cerastium* was also abundant in places, which, in consequence of all the bracts being entirely herbaceous, I at the time considered to be *C. tetrandrum*, Curt.; and Mr. Stratton and Mr. A. G. More, who have both had opportunities of studying the plants of this genus in the Isle of Wight, also refer the Channel Islands specimens to *C. tetrandrum*. They appear, however, to deviate considerably from the typical *tetrandrum* in mode of branching as well as in the direction of the pedicels, and I am now inclined to place the plant rather under the *C. pumilum* of Curtis (= *C. obscurum*, Boreau), of which several forms are distinguished by the French and German botanists. I cannot, however, consider *C. pumilum* specifically distinct from *C. tetrandrum*. Large green specimens of the Jersey plant, with elongated internodes, are perhaps the *C. pedunculatum* of Babington, described and figured as a species in the second volume of the Mag. of Zool. and Bot., but which he subsequently referred to *C. tetrandrum*. Less common species noticed with those above named were *Polygala depressa*, *Medicago denticulata*, *Trifolium filiforme*, *Trichonema Columnæ* (which was in good flower and quantity by the second martello tower in St. Aubin's Bay), and *Scilla autumnalis*, of course not in flower. With the *Trichonema* a *Herniaria* occurred, which seems to me to be the ciliated form of *H. vulgaris*, L., of Babington. Dr. Boswell Syme, however, refers all plants from the Channel Islands he has seen to *H. ciliata*, Bab., but my specimens differ in habit from authentic specimens of this doubtfully-distinct species from Cornwall. The remarkable desolate tract in the west of Jersey called the Quenvais would well reward a very careful search; a rapid walk in a straight line across it showed, besides most of the species already recorded above, abundance of *Euphorbia Paralias* and *E. portlandica*, *Schœnus nigricans*, *Silene conica* just in flower, and plenty of *Hutchinsia petræa*, a species not previously recorded for the district, though detected in very small quantity last year in some other part of the island. Though this plant is in

England restricted to limestone hills, it is common on sea-sand on a part of the coast of France adjacent to the Channel Islands (see Lloyd, p. 55). The handsome rayed *Senecio*, mentioned by Boswell Syme in the fifth volume of 'English Botany' (p. 80) as var. *radiatus* of *S. vulgaris*, made so great a show that it was hard to believe it merely Groundsel. De Candolle, indeed, placed the plant as a variety of *S. lividus*, L. (non Sm.), of S. Europe, with which it agrees in its large heads, its phyllaries, and achenes, but differs in its weak stem, shaggy covering of wool, and more deeply-divided leaves. It seems worthy of subspecific rank. A dwarf form of a capreolate *Fumaria* was also noticed in the sand, and it was afterwards found in its properly-developed condition commonly in the island. The "*F. capreolata*" of Babington's 'Primitiæ Fl. Sarn.' he afterwards (Linn. Journ. Bot. iv. 165) referred to *F. confusa*, Jord. Though I confess to being unable to distinguish the forms into which *F. capreolata* has been divided, I think the common Channel Island plant, which has large pink flowers, bears more resemblance to *F. Boræi* than to any other British variety.

The other plants of interest noticed in Jersey were these:—*Raphanus maritimus;* the botanist who has seen the root-leaves of this in the Channel Islands will be scarcely likely to put it with *R. Raphanistrum*. *Sarothamnus scoparius;* the prostrate variety described by Mr. Bailey, in Cornwall, was abundant on the rocks exposed to the western gales at L'Etac, and presented a very singular appearance, the stems spreading from a centre, and pressed flat against the stone, and the numerous flowers at their extremities forming collectively a broad golden ring. *Tillæa muscosa;* abundant close to St. Helier's. *Smyrnium Olusatrum;* as far as I am able to judge, this must be a native plant in the Channel Isles; I think, too, with Mr. Bentham, it is so in the south of England near the sea. *Echium plantagineum;* the root-leaves of this do not at all suggest a Boraginaceous plant; the specific name, which may have puzzled some who have seen only the fully-grown plant, is excellently descriptive of them. *Orchis Morio;* this was believed not to grow in the islands when Professor Babington published his 'Primitiæ;' we found it in some abundance on the Quenvais. *Arum italicum;* this is the only *Arum* we saw; Mr. Stratton recognized it at once from the leaves, being familiar with it in the Isle of Wight. When in flower, it is very distinct-looking. In well-developed plants the long, weak, pale yellowish-green spathe falls over by its own weight, and conceals the yellow spadix, but this, Mr. Stratton says, is often the case also with *A. maculatum* in the Isle of Wight, so that it cannot be considered distinctive. We noticed leaves with white veins, as in the south of Europe, and also some with dark spots, like those of *A. maculatum* (which probably does not occur in the islands). Both species grow in the neighbouring parts of France, according to Lloyd. *Gymnogramma leptophylla;* under the able guidance of Dr. Bull, an excellent resident botanist, I saw three localities for this in St. Laurence parish; all were similar; the base of high hedgebanks of clay-slate facing the south, and concealed by larger vegetation.

In Guernsey, I noticed in the sandy districts most of the same species as in Jersey, and in addition, *Arabis hirsuta*, *Sagina maritima*, *S. ciliata*, *Trifolium suffocatum*, and *Aira caryophyllea vera*. *Erodium moschatum* occurred in several wild-looking places on the east side of the island. In a pasture field above the beautiful bay called Moulin Huet I met with a singular variety of *Ranunculus bulbosus*. This is unfortunately in too young a state, a single flower only being expanded on each plant, to allow of a full description, but the characters present are,—Bulb small (about the size of a Haricot Bean), circular on perpendicular section; root-leaves on very long petioles, trifoliolate, the centre leaflet very long stalked; leaflets 3-sect, the segments cut into broadly linear segments; flowering-stem 15 in. high, very upright, and with the leaves and calyces thickly covered with long, spreading white hairs, giving the plant a greyish colour; peduncles not furrowed; flowers considerably larger than in ordinary *R. bulbosus*. The plant looked very unfamiliar when growing, the leaves much resembling those of *R. chærophyllus*, L., of S. Europe. but part of its strange appearance was found to be due to the under surface of many of the leaves being infested by a filamentous substance (parasitic fungus?) of a yellowish-grey colour. The plant does not agree with any of the forms described as species by Jordan in his 'Diagnoses.'

NOTES ON *PORTULACA PSAMMOTROPHA*.

By H. F. Hance, Ph.D., etc.

Twenty years ago I described, under the above name, a very handsome large-flowered Purslane, found on Prata Island, in the China Sea. A comparison of my own extended diagnosis of this (Walp. Ann. Bot. Syst. ii. 660), carefully drawn up from living specimens, which, dug up with their native sand, and copiously supplied with seawater, flourished luxuriantly with me, with Mr. Bentham's brief character of *P. australis*, Endl. (Fl. Austr. i. 169), leaves no doubt that the two are identical. The plant had hitherto only been met with by Robert Brown in the Gulf of Carpentaria, on the N. coast of Australia, and Mr. Bentham, having seen no authentic specimens, was obliged to frame his character from Endlicher's description and the figure of F. Bauer, to which, occurring in a very rare book, I have not here access. As in the wild state the flowers are ¾ inch in diameter, it may be commended to the lovers of succulent plants as likely, under cultivation, to become almost as showy as *P. Thellusoni*.

The small and isolated island on which this plant is found, washed by a frequently tempestuous sea, lying in the direct track of vessels homeward bound from China, and the reefs surrounding which have proved the grave of many a noble vessel, whence they have derived their name (*prata* = silver in Portuguese), from the value of the wrecks and the amount of treasure submerged, is from a phytogeographical point of view very interesting. Its N.E. end is situated in lat. 20° 42′ 3″ N., long. 116° 43′ 22″ E.; it is about a mile and a half long and half a mile wide, nowhere more than 30 or 35 feet above the sea-level, composed exclusively of disintegrated coral and sand, and surrounded on nearly two-thirds of its circumference by a steep coral barrier about forty miles round. With the exception of innumerable gannets and a few Chinese wreckers and fishermen who constantly visit it, it is destitute of inhabitants. It is distant about a hundred and fifty British miles from the nearest point of the Chinese continent, about two hundred and eighty from the N.E. extremity of the island of Luzon, and three hundred and seventy-five from

Hainan. It is somewhat remarkable that, with such a geographical position, the flora of this reef-girt islet should show an unmistakable affinity with that of the great Australian continent, from which it is distant about one thousand nine hundred miles, the large islands of Borneo, Celebes, Papua, the Philippines and the Moluccas being interposed. The following are—so far as my memory serves me—all the plants hitherto met with on Prata Island:—

Senebiera integrifolia, De Cand.; *Portulaca australis*, Endl.; *Triumfetta procumbens*, Forst.; *Sesuvium Portulacastrum*, L. var.?* *Scævola Kœnigii*, Vahl; *Tournefortia argentea*, L. f.; *Ipomœa congesta*, R. Br.; *Ipomœa Pes-capræ*, Roth; *Euphorbia Atoto*, Forst.

These species are found without a single exception in Queensland, and many of them also in North Australia; and, though some are more or less diffused as littoral plants through the Pacific isles, the Malayan Archipelago, and the South Asiatic coasts, they all seem primarily of Australian origin. The occurrence of *Calogyne chinensis*, Benth., *Thysanotus chinensis*, Benth.,† and *Philydrum lanuginosum*, Banks, in S.E. China, affords curious evidence of a connection between the Southern Asiatic and North-eastern Australian floras.

A SUPPLEMENT TO THE 'FLORA VECTENSIS.'

By Alexander G. More, F.L.S., M.R.I.A.

(*Concluded from page* 172.)

**Anacharis Alsinastrum*, Bab.; *Elodea canadensis*, Rich. Ponds at Barton Farm, 1860 (J. Pristo). Pond by the roadside near Lynn Farm, 1863. Millstream at Shide, near Newport (F. Stratton). Planted by Dr. Bell Salter in a pond near the Spencer Road, Ryde, previous to 1850.

Orchis ustulata, L. On Ashey Down, near the farm, 1853 (T. Baines). Near the reservoir on Ashey Down, 1863. Carisbrooke Castle (R. Tucker).

O. incarnata, L. Rookley Wilderness, and in the Landslip near Bonchurch. Apparently more frequent than *O. latifolia*, L., but I cannot distinguish these plants with certainty.

Gymnadenia conopsea, R. Br. Banks near Steephill Farm, very rare in the Undercliff (A. J. Hambrough).

Habenaria bifolia, R. Br. Near Shanklin! (Rev. T. Salwey). Very rare in the Isle of Wight, while *H. chlorantha* is frequent.

Ophrys muscifera, Huds. Copse above Brading.

Neottia Nidus-avis, Rich. A single plant at Steephill. Barton Wood, Osborne (J. Pristo).

Epipactis media, Fries. West end of Cowpit Cliff Wood, near Shanklin! (Rev. T. Salwey). In the Landslip sparingly. The typical *E. latifolia* is, I believe, the more frequent plant, but I confess that I cannot satisfactorily separate the two.

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* This is my *Psammanthe marina* (Walp. Ann. Bot. Syst. ii. 660), which, though certainly referable to *Sesuvium*, is perhaps distinct as a species, the styles being apparently always united as far as the middle.

† I have already pointed out (Ann. Sc. Nat. 5e sér. v. 245) that Mr. Bentham was mistaken in supposing the petals of this species to be destitute of fringe. It agrees in every character with its Australian congeners.

Gladiolus illyricus, Koch. In a heathy copse close to Apse Farm! (Mrs. Phillips, July, 1865). A single specimen only was gathered; but the locality is quite a natural one, and the plant exactly corresponds with the *Gladiolus* found in Hampshire. (See Linnean Soc. Journal of Proc. vi. 177, November, 1862.)

Narcissus Pseudo-narcissus, L., var. **Bromfieldii*, Syme. This is the var. γ of 'Flora Vectensis,' and from its place of growth is evidently not indigenous.

**N. biflorus*, Curt. Weston and Easton, Freshwater (R. Tucker). An escape or remains of cultivation in all the localities.

**Tulipa sylvestris*, L. My sister informs me that the station at Hardingshoot is now (1871) nearly destroyed, through the recent building of a farmhouse on the exact spot; but the plant was certainly the relic of a former garden.

**Ornithogalum umbellatum*, L. On the north slope of Bembridge Down, near the ruins of a cottage (Rev. C. A. Bury). Sparingly in a wood near Shalfleet, and in a meadow near Afton House (Dr. G. R. Tate). The plant as found in the Isle of Wight agrees with *O. angustifolium* of Boreau.

Allium vineale, L. On the edge of the cliff, and on slipped débris in Sandown Bay, the only species found here. On the east bank of the Medina, above Black Mill (F. Stratton). Chalk pit west of Mountjoy (Miss Dennett). Near Middleton House, and by the Yar above Yarmouth (Dr. G. R. Tate). Near the Rectory House at Freshwater.—Var. *bulbiferum*, Syme. By East Medina millpond (J. Pristo).

A. oleraceum, L. Grassy banks on the edge of the cliff above Steephill and St. Lawrence (A. J. Hambrough and A. G. M., 1858). This is the only locality known in the Isle of Wight.

**Asparagus officinalis*, L. A few seedling plants on the sandhills below St. Helen's, close to the Ferry House, and evidently sprung from some stray seeds washed ashore. This may explain the origin of the *Asparagus* at Norton Spit, where it grows at the extremity of a sandy point exposed to the tideway, and close to one of the oldest towns in the island. It is quite different from the prostrate Cornish plant.

Juncus diffusus, Hoppe. Very fine in Alum Bay (J. G. Baker).

Luzula Borreri, Bromf. In a copse above Brading, Quarr Copse, etc. There is now no doubt that this is merely a form of *L. pilosa*, with luxuriant foliage, and the fruit not fully developed. In the immature seeds of *L. pilosa* the crest is straight, as had been ascertained by Dr. Bromfield himself (Flor. Vect., footnote to p. 518).

Butomus umbellatus, L. Formerly in a ditch near Pan Common (Major Smith). Appears indigenous at Freshwater.

Arum italicum, Mill. At Steephill and other places in the Undercliff (A. J. Hambrough, 1853). The plant grows plentifully in the wild bushy slopes included within the grounds at Steephill; also in similar bushy places at intervals all along the way to Niton, but does not extend beyond the limits of the Undercliff. As *A. italicum* grows wild at Cáen, Cherbourg, etc., on the north coast of France, and was also found by Mr. Hambrough in Sark and Guernsey, and recently by Dr. Trimen and Mr. Stratton in Jersey, there is no reason to doubt its being native in the Isle of Wight; nor can any one who has seen it in the Undercliff at the commencement of June, when it is in full flower, hesitate to pronounce it indigenous. The absence of white veins has been noticed by French as well as English writers.

Sparganium minimum, Fries. This is the only form of *S. natans* found in the Isle of Wight, where it is confined to the small pools near Cranmore Farm. The long floating leaves which abound in the Medina and East Yar belong to *S. simplex*, Huds., and I have once or twice found it flowering in the Yar.

Lemna gibba, L. In several ditches on the north side of Brading Harbour, and near Brading Quay.

? *Potamogeton plantagineus*, Ducr. Peaty pools in the marsh at Easton, Freshwater (A. J. Hambrough, 1859). In the Wilderness at Rookley (F. Townsend). Requires confirmation.

P. pectinatus, L., var. *scoparius*, Wallr. Marsh ditches near the sea, at Brading and at Yarmouth. I have not succeeded in finding *P. flabellatus*, Bab., though in the appendix to Mr. Venables' 'Guide Book' the name was misapplied to this variety *scoparius*.

Obs. *P. lucens*, L., is not now to be found in Sandown Marshes, and it is believed that some other species was mistaken for it.

Ruppia rostellata, Koch. This is the only form of *Ruppia* which I have identified, but the shape of its fruit varies considerably. On the same plant the earlier fruits are scarcely at all oblique, while those produced later on the upper branches of the same plant are much curved and deeply notched.

Zostera nana, Roth. Wootton Bridge (Bromf. in Phyt.). Freshwater Creek (A. G. M.). *Z. angustifolia* is common, but scarcely deserves to rank as a variety of *Z. marina*.

Eleocharis multicaulis, Sm. In some small pools on heathy ground at Lynn gravel pits. With *S. pauciflorus* on St. Helen's Green.

Scirpus pauciflorus, Lightf. On the east bank of the Yar, between Freshwater and Yarmouth (J. G. Baker).

S. fluitans, L. Staplers (F. Stratton). At the Wilderness (F. Townsend, who informs me that this is the plant recorded doubtfully in 'Flora Vectensis' as *Carex dioica*).

Obs. *Eriophorum vaginatum*, L., must be excluded. (See 'Phytologist,' iii. p. 1032.)

Carex paniculata, L. The form with narrow unbranched panicle occurs on Lake Common, and in the Parsonage Lynch, Newchurch.

C. teretiuscula, Good. Sparingly in the wettest part of Easton Marsh, Freshwater (1862). In the Wilderness at Rookley! (F. Stratton, 1870).

C. axillaris, Good. In the hollow at north-east corner of Quarr Copse. Both this locality and the description given of *C. Bönninghauseniana* by Dr. Bromfield belong really to *C. axillaris*, Good., which occurs also in the ditch under the boundary fence near Binstead. In a hedge-bank by Middleton Lane, Freshwater (A. G. M.)., and in Saltern's Copse, near Norton, Freshwater (Herb. Bromf.)

C. Bönninghauseniana, Weihe. Parsonage Lynch, Newchurch, in tolerable plenty (1858). This is the only locality known in the Isle of Wight, and *C. axillaris* does not grow here. I have not succeeded in finding any ripe fruit upon *C. Bönninghauseniana*; and as both at Newchurch and near Tunbridge Wells I have found it growing in company with *C. remota* and *C. paniculata*, I think the suggestion that it is a hybrid is probably correct.

C. vulgaris, Fries. At Alverstone Lynch, in Sandown Marshes, and at Easton, Freshwater, I have found a tall form which I believe is the plant mentioned by Dr. Bromfield as "*C. stricta*," which latter has not come under my notice. The "variety *β*. of *C. acuta*," gathered by Dr. Bromfield, in Alverstone Lynch, belongs also to *C. vulgaris*.

C. distans, L. Frequent in meadows and marshy places near the sea. Bembridge, Springvale, Wootton, Freshwater, etc.

C. fulva, var. *β*. *C. Hornschuchiana*, Hoppe. Very rare. Sparingly on heathy ground near Lynn Farm. Plentiful at the upper end of Colwell Heath. These are the only two stations where I have seen it. The marshy meadows at Easton, Freshwater, produce a variety of *C. distans*, with glumes less mucronate than usual. (See 'Report of Botanical Exchange Club,' 1862.)

C. pallescens, L. In Firestone Copse with *C. lævigata*. Ningwood (Dr. G. R. Tate).

C. pendula, Huds. Plentiful under the cliff at Foreland, Bembridge. In Steyne Wood, sparingly.

C. Pseudo-cyperus, L. Centurion's Copse, sparingly. Copse between Alverstone and Sandown (A. J. Hambrough). By the stream at Monkton, near Ryde.

C. paludosa, Good., var. *Kochiana*, De Cand. Ditches by the causeway running across Sandown Marshes, close to Sandown. This has frequently two stigmas. I have found some fruits bearing two, with others bearing three stigmas upon the same spike.

[*Echinochloa Crus-galli*, Beauv. A single plant, on rough ground near the shore at Freshwater, 1869 (F. Stratton).]

[*Setaria viridis*, Beauv. Many plants in a sandy stubble field near the path leading from Sandown Church to Pan Common, 1857.]

[*S. glauca*, Beauv. One plant at Alverstone, Whippingham! 1869 (J. Pristo).]

‡*Gastridium lendigerum*, Beauv. Frequent in cornfields about Bembridge. At Brighstone, etc. Whippingham! (J. Pristo). A colonist.

Agrostis vulgaris, L., var. *A. pumila*, Lightf. Plentiful all over the warren at Alum Bay.

A. alba, L., var. *A. maritima*, Lam. Frequent, especially on wet, slipped banks along the coast.

[*Polypogon monspeliensis*, Desf. Very sparingly on salt-marsh ground above the bridge at Norton, close to Saltern Copse, 1868 (Dr. G. R. Tate). Mr. Stratton has not succeeded in finding this rare Grass in the above-named locality, and until the circumstances of its occurrence are more closely examined I prefer to exclude it as introduced by some accident.]

Calamagrostis lanceolata, Roth. Plentiful in a small boggy thicket at Knighton, growing with *Lastræa Thelypteris* (1857).

Catabrosa aquatica, Beauv. Pond near St. Helen's. Pan fields, near Newport (F. Stratton). In a little stream north of Freshwater Farm.

Kœleria cristata, Pers. Sparingly on St. Helen's Spit. This is near to *K. albescens*, De Cand., but the stem is not pubescent.

Poa nemoralis, L. In a deep, sandy lane between Brook Church and Compton Farm, sparingly (1862).

P. compressa, L. On the walls of the garden at the Chantry House, Newport (Dr. H. Trimen).

Sclerochloa procumbens, Curt. Embankments round Brading Harbour. Foot of the sea-wall at Sea View and thence to Ryde. Banks of the Medina below Newport.

S. Borreri, Bab. Frequent, and much more often seen than *S. procumbens*. Embankments round Brading Harbour. Shore at Bembridge; at foot of the sea walls between Sea View and Ryde. King's Quay (J. Pristo). Banks of the Yar, near Freshwater Church.

S. distans, Bab. Less frequent than the former. St. Helen's. Ryde. Banks of the Medina below Newport. At Yarmouth and Norton.

Glyceria aquatica, Sm. Sparingly in a small chine running down to Colwell Bay (H. C. Watson, 1861), and I have since gathered it in the same locality.

G. plicata, Fries. Brading, Newchurch, Ryde, etc., but less frequent than the typical *G. fluitans*, Scop.

†*Briza minor*, L. Plentiful in corn crops on a gravelly soil at Alverstone, Whippingham (J. Pristo). Fields on the east bank of Wootton Creek.

Festuca (Vulpia) ambigua, Le Gall. Plentiful on the sandhills at St. Helen's Spit, 1860. (See Linnean Soc. Journ. of Proc. vol. v. p. 189, 1861.) It formerly grew also on the Dover at Ryde, as shown by some specimens collected by Dr. Bromfield, and preserved at Kew.

F. (Vulpia) Myurus, L. Wall at Easton, and on sand at Compton Bay (J. G. Baker).

F. arenaria, Osbeck; *F. sabulicola*, L. Duf. Sandhills at St. Helen's and at Norton. This is the var. *rubra* of 'Flora Vectensis,' and Dr. Bromfield's var. *duriuscula* includes *F. rubra*, L.

F. arundinacea, Schreb. Shore at Bembridge. In Whitecliff Bay. Colwell Bay, etc., frequent.

[*Bromus tectorum*, L. Once found, in 1858, among grass crops at Bembridge, growing with *Isatis tinctoria*, *Poterium muricatum*, and other weeds evidently sown with the crop.]

B. asper, Murr. I have seen only *B. serotinus*, Benek.

B. (Serrafalcus) Ferronii, Mabille. Edge of the Culver Cliff. A small downy plant, with large, soft, silky spikelets and pilose awns. It and the following belong, no doubt, to *B. mollis*, L.

B. (Serrafalcus) hordeaceus, L. On the sandhills at St. Helen's Spit. The panicle is closer, and the spikelets more shining than in *B. racemosus*.

B. (Serrafalcus) racemosus, L. Frequent in low marsh meadows at Brading, Alverstone, Godshill, etc.

B. (Serrafalcus) commutatus, Schrad. Frequent along waysides and under hedges; also in cultivated land, but not in meadows, like the former. About Bembridge, St. Helen's, Ryde, Wootton, Shalfleet, etc.

Triticum (Agropyrum) acutum, De Cand.; *T. laxum*, Fries. Plentiful on St. Helen's Spit, 1856. Sandown Bay. Newtown. Norton, Freshwater. Much more abundant than the typical *T. junceum*, with which it is often associated.

T. (Agropyrum) pungens, Pers. Sea View Bay, 1859. Brading Marshes. Newtown, and on the banks of the creeks about Yarmouth. Stem solid.

T. (Agropyrum) pycnanthum, Godr. et Gren. On the embankment of Brading Harbour, 1861. Identified by Dr. Boswell Syme.

Obs. I have not succeeded in finding *T. caninum*, L., in the Isle of

Wight, and I believe it is much less frequent than is generally supposed. It often grows in Beech woods with *Hordeum sylvaticum*, Huds.

Spartina stricta, Roth. Mud banks at King's Quay (J. Pristo).

Equisetum palustre, L., var. *polystachion*. In the Wilderness below Appleford Farm, in some plenty, 1860.

Ceterach officinarum, Willd. Wall of a cottage-garden near the windmill, Bembridge. Wall at Knowle Farm, found by Mr. Blake (F. Stratton). Walls near East Cowes (J. Pristo).

Polypodium vulgare, L , var. *serratum*. Near Grove; at Quarr Abbey; and remarkably fine at Brighstone. In this variety the pinnæ are deeply serrate and sometimes irregularly pinnatifid.

[*P. Robertianum*, Hoffm. Was observed a few years ago quite established on a wall close to a greenhouse at Swainston (J. Pristo). Also seen growing on one of the walls at Carisbrooke Castle (Rev. W. M. Frost).]

Polystichum lobatum, Roth. Bank by Woodhouse Copse and near Alverstone, Whippingham, single roots only (J. Pristo). Hedgebank opposite the Inn at Calbourne! (Rev. E. Venables).

Lastrea Thelypteris, Presl. Thicket, north of the stream below the bridge at Newchurch.

L. Oreopteris, Presl. Still grew sparingly by the stream-side at Apse Castle, and also near Guildford in 1862 and 1863.

L. Filix-mas, Presl, var. *Borreri*. Centurion's Copse, Bembridge. Wilderness at Rookley; Fatting Park Copse (J. Pristo), etc., not unfrequent. Also in Steyne Wood, a variety with pinnules deeply incised, yet retaining the ruddy scales on the stipes. Var. *elongatum*, Moore. Copse near the Harbour at Bembridge (figured in 'Nature-printed British Ferns'). In Steyne Wood I have found some plants which seem intermediate between *L. Filix-mas* and *L. spinulosa*, and which I suspect may be hybrids.

L. spinulosa, Presl. Steyne Wood and Centurion's Copse, etc., near Bembridge; Young-wood Copse; Parsonage Lynch, Newchurch; and in the wilderness at Rookley, but far less common than *L. dilatata*, which abounds in all our boggy thickets, and is frequent on damp hedgebanks.

Asplenium Trichomanes, L. East Cowes! (Dr. A. Wallace). Norris Castle and on a bridge near Alverstone (J. Pristo). On tombs, in Carisbrooke churchyard (F. Stratton).

A. marinum, L. Blackgang (the late Major Smith).

Botrychium Lunaria, Sw. In the Wilderness at Rookley (A. J. Hambrough).

Lycopodium clavatum, L. On the top of St. Boniface Down above Bonchurch, discovered in 1860 by a gardener named Robert Symmans. It grows sparingly, in one place only, among the heath.

Chara (Nitella) syncarpa, Thuill. Pool, near Gurnard Bay! (F. Stratton).

C. (Lychnothamnus) alopecuroides, Del. Found by me in 1862, covering the bottom of the shallow brine-pans at the west mouth of Newtown Creek, close to the boiling-houses; and again, in 1863, in the pits or reservoirs on the east side of the Creek, close to the village of Newtown, growing in salt water from eight inches to two feet deep.

C. fœtida, A. Br., *C. vulgaris*, L.? Ditches, near Brading Harbour; Sandown Marshes; Freshwater and Yarmouth, etc., the commonest species in Isle of Wight.

C. hispida, L., var. *pseudo-crinita*, and *C. polyacantha*, A. Braun. On Golden's Common, Freshwater! (F. Stratton). This agrees fairly with Plate MMDCCXLVI of the Flora Danica, and also with dried specimens in Braun. Rab. et Stiz., and is much more closely covered with spines than in the normal *C. hispida*.

C. fragilis, Desv. Golden's Common, Freshwater! (F. Stratton).

Mr. W. P. Hiern has very kindly examined and named, according to his views lately published in the 'Journal of Botany' (pp. 65, etc.), my series of Batrachian *Ranunculi*, collected in the Isle of Wight; and, as he has given so much time and study to the subject, I gladly avail myself of his nomenclature, which will be useful for comparison with what has been said before on p. 74. The numbers prefixed to the names are those used by Mr. Hiern, and my comments are enclosed in brackets.

1. *Ranunculus homœophyllus*. Pond at Bembridge. (This is floating "*hederaceus*.") 25. *R. trichophyllus*. Cothey Bottom Copse and Spencer Road, Ryde. "A large form" of the same from Brading Marshes Mr. Hiern thinks may belong to *R. floribundus*. 29. *R. Drouetii*. Knighton Upper Mill-pond and Brading Marshes. 19. *R. Godronii*. Brading Marshes. (This is my "*R. Drouetii*, with floating leaves," and I still think it belongs to *R. Drouetii* rather than to *R. trichophyllus*. It has no relation to the large form of *trichophyllus* above mentioned, but passes into the typical *Drouetii*.) 13. *R. elongatus*. Sandown Marshes. 14. *R. truncatus*. Sandown Marshes. (These two are the later stage of my "*peltatus*.") 15. *R. floribundus*. Bembridge; Yaverland; Pan Common and Sandown Marshes. (This I believe to be the early stage of the plant we call "*peltatus*" and "*truncatus*.") 18. *R. radians?* Dennetts Marsh, Bembridge. (This is what I call "*heterophyllus*," and Mr. Hiern remarks that it passes into *R. floribundus*, which I have myself collected in a different season, from the same small pond; each being the only form in one year.) 11. *R. Baudotii*. Brading Marshes; pond towards Yaverland; and Nettlestone. *R. Baudotii*, var. *cæspitosus*. Brading Marshes. 34. *R. marinus*. Brading Marshes. (This is simply *R. Baudotii*, without floating leaves.) With the addition of *R. Lenormandi*, *R. hederæfolius*, and *R. submersus* (*floribundus*, without floating leaves), we have, in the Isle of Wight, thirteen out of the twenty-two British forms described by Mr. Hiern.

OMITTED.

Valeriana dioica, L. In Priory Marsh Meadows and in Clatterford Marsh, near Carisbrooke (F. Stratton).

Zannichellia palustris, L. The typical form is abundant in the mill-dam at Lower Knighton. Var. *Z. pedicellata*, Fries, is plentiful in ditches near the coast.

In conclusion, it may be well to enumerate here the results which have been obtained of late years both in adding to, and taking from, the list since it was left by Dr. Bromfield and Dr. Bell Salter. These will be best shown under separate heads, as follows:—

ADDENDA.

Full species added.

Lepigonum rupicola.
Cineraria campestris.
Gentiana campestris.
Bartsia viscosa.
Mentha sativa.
Polygonum mite.

? Euphorbia Paralias.
†Gladiolus illyricus.
Allium oleraceum.
Arum italicum.
Carex teretiuscula.
C. Bönninghauseniana.
? Polypogon monspeliensis.
Calamagrostis lanceolata.
Poa nemoralis.
Glyceria aquatica.
Lycopodium clavatum.

Subspecies added.

Papaver Lecoqui.
Fumaria pallidiflora.
F. muralis.
Viola Reichenbachiana.
Cerastium pumilum.
Lepigonum salinum.
Ulex Gallii (var. ?)
Agrimonia odorata.
Epilobium obscurum (var. ?).
Callitriche obtusangula.
? Galium erectum.
Arctium majus.
Hieracium tridentatum.
? Orobanche amethystea.
Atriplex deltoidea.
? Potamogeton plantagineus.
Zannichellia pedicellata.
Festuca ambigua.
Triticum acutum.
T. pungens.
T. pycnanthum.
Galium approximatum.
G. decolorans.
Rumex sanguineo-crispus.
Polygonum minori-persicaria.

Varieties added which are held as species by some authors, but not generally accepted by British Botanists.

Ranunculus trichophyllus.
R. Drouetii.
R. Baudotii.
R. peltatus.
R. floribundus.
Nasturtium siifolium.
Erophila brachycarpa.
Viola tricolor.
Sagina ambigua.
Stellaria neglecta.
Arenaria leptoclados.
A. Lloydii.
Lepigonum medium.
Vicia segetalis.
Rubus Balfourianus.
Rosa tomentella.
R. andevagensis.
R. dumetorum.
Arctium intermedium.
A. nemorosum.
Centaurea serotina.
Sonchus lacerus.
Taraxacum udum.
Erythræa capitata.
Euphrasia verna.
E. serotina.
Thymus Chamædrys.
Chenopodium paganum.
Polygonum arenastrum.
P. microspermum.
Epipactis media.
Bromus hordeaceus.
B. Ferronii.
Chara polyacantha.

Introduced Plants added—

*Helleborus viridis.
*Diplotaxis tenuifolia.
Alyssum calycinum.
Camelina fœtida.
Iberis amara.
Isatis tinctoria.
Dianthus deltoides.
Hypericum hircinum.
Geranium pratense.
G. striatum,
Erodium moschatum.
*Melilotus arvensis.
Trifolium hybridum.
T. patens.
Vicia lutea.
Alchemilla vulgaris.
Œnothera odorata.
Crucianella stylosa.

Valerianella carinata.
Crepis biennis.
Lycium barbarum.
*Mentha rubra.
? Chenopodium ficifolium.
*Anacharis Alsinastrum.
Setaria viridis.
S. glauca.
Echinochloa Crus-galli.
? Polypogon monspeliensis.
Bromus tectorum.

Of these only five can be considered permanently naturalized in situations where they appear wild.

DELENDA.

Errors of name, etc.

Ranunculus fluitans.
R. circinatus.
Barbarea stricta.
Cochlearia grœnlandica.
? Silene noctiflora.
Hypericum dubium.
? Parnassia palustris.
Lathyrus maritimus.
Ceratophyllum.
Gnaphalium sylvaticum.
Artemisia cærulescens.
Hieracium murorum.
Erythræa littoralis.
Mentha sylvestris.
Lamium intermedium.
Stachys ambigua.
Ballota ruderalis.
? Statice spathulata.
Salix laurina.
Potamogeton lucens.
Eriophorum vaginatum.
Carex dioica.
C. stricta.

Many of these mistakes were corrected by Dr. Bromfield in the 'Phytologist,' but the plants are all entered in the regular order, mostly without any mark of doubt, in the 'Flora Vectensis.'

Casuals; Planted, or Not Wild.

Delphinium Ajacis.
Nymphæa alba.
Fumaria micrantha.
Hesperis matronalis.
Koniga maritima.
Linum usitatissimum.
Erodium moschatum.
Melilotus alba.
Lathyrus hirsutus.
Œnothera biennis.
Lythrum hyssopifolium.
Sedum album.
Sempervivum tectorum.
Viscum album.
Onopordum Acanthium.
Centaurea solstitialis.
C. Calcitrapa.
Crepis setosa.
Anchusa sempervirens.
Atropa Belladonna.
Datura Stramonium.
Mentha piperita.
Salvia pratensis.
Teucrium Chamædrys.
Lysimachia nummularia.
Atriplex nitens.
Euphorbia Lathyris.
Avena strigosa.

Extinct, possibly or probably.

Thalictrum flavum.
? †Brassica oleracea.
Dianthus prolifer.
? †D. Armeria.
Malva *var.* micrantha.
[Atropa Belladonna.]
Euphorbia Peplis.
? *Tulipa sylvestris.

After making these additions and deductions, the whole Flora amounts to 753 out of the 1263 species given in Hooker's 'Students' Flora,' or to about 100 more according to Babington's 'Manual'; and if the 50 well-established naturalized species be added, the total will amount to about 800 or 900 species, according to the author followed, this being nearly three-fifths of the British flora.

Only five plants are in the British Isles peculiar to the Isle of Wight, viz.:—

Calamintha sylvatica.
Festuca ambigua.
Arum italicum.
†Matthiola incana.
Chara alopecuroides.

The Isle of Wight shares *Gladiolus illyricus* with Hampshire, and *Pulmonaria angustifolia* with Hants and Dorset, while such plants as *Cyperus longus*, *Melampyrum arvense*, and *Orobanche cærulea*, are among the rarest of English plants.

No enumeration of a flora can be complete without considering the proportion of naturalized plants, and the conditions under which they occur; and I hope to return to this subject on a future occasion.

ERRATA.—On page 73, "Annual Report for 1859" should be "for 1858." It was published in 1859.

The volumes of 'Phytologist' in which Dr. Bromfield published his Catalogue date from 1848 (not from 1847) to 1851.

SHORT NOTES AND QUERIES.

SILER TRILOBUM, *Scop.*, IN ENGLAND.—In the beginning of June, 1867, I found, upon rough chalky rising ground near Cherry Hinton, Cambridgeshire, growing amongst *Rubus*, *Viburnum Lantana*, and other plants characteristic of a calcareous soil, an Umbelliferous plant which I could not determine, but imagined to be a variety of *Smyrnium Olusatrum*. On the 25th of May, 1871, I again visited the spot (being the first opportunity I had had since 1867), and found the plant still growing there. I took specimens to the British Museum, where it was determined to be *Siler trilobum*, Scop. (=*S. aquilegiæfolium*, Gærtn.). The locality is a limited one, and more so now than formerly, owing to the increase of cultivation (Clover principally) on the bushy, chalky ground below. It is singular that, in the immediate neighbourhood, grow two very rare British *Umbelliferæ*,—*Athamanta Libanotis* and *Bunium Bulbocastanum*; but, whereas the latter of these grows exclusively, so far as I could see, in the semi-cultivated ground near, amidst Sainfoin and Clover, the *Siler* affects the uncultivated chalk. It seems strange that such a large plant should have, until now, escaped detection; but I have Professor Babington's authority for stating that it has always been hitherto considered to be *Smyrnium Olusatrum*,—to which, when young, the leaves bear a strong resemblance,—and is entered as that species in the 'Flora of Cambridgeshire,' p. 104. Jacquin's description of its habitat in Austria, "in asperis et calcareis montibus," agrees admirably with the Cherry Hinton locality. —J. COSMO MELVILL.

[There will, of course, be some doubt as to the nativity of this fine

Umbellifer; Mr. Melvill considers it indigenous. We hope to give a plate of it shortly, but it will be well to wait till the fruit is ripe before doing so; indeed, in the absence of ripe fruit, it is not possible to speak with absolute certainty as to its name.—Eds. Journ. Bot.]

Polygala austriaca, *Crantz.*, in Kent.—I have much pleasure in sending specimens of this, which I had the good fortune of discovering on June 5th on Wye Down. Dr. Boswell Syme, to whom I submitted a specimen, pronounced it to be undoubtedly *P. austriaca.* On June 17th I again, in company with another botanist, found it plentifully growing in two narrow strips of rough, chalky ground on the border of copsewood. There must surely be more of it on other parts of the downs, which are very extensive.—J. F. Duthie.

[We hope our readers will examine any chalk districts in their neighbourhoods for this interesting *Polygala*, hitherto only known in England in two spots in North Yorkshire. It is readily distinguished from *P. calcarea*, Schultz, by its much smaller flowers and narrow wings. The central nerve also of the wings is either not at all or but very slightly branched, and the branches very rarely, though occasionally to a slight extent, inosculate with those of the lateral veins. Some of Mr. Duthie's specimens are between four and five inches high. They seem referable to the restricted *P. austriaca* of Reichenbach; the Teesdale plant being his *P. uliginosa.*—H. T.]

Hymenophyllum unilaterale.—*A propos* of the extract relative to this plant printed at page 188, I wish to remark that through the kindness of Lady Barkly I had the opportunity of examining specimens of the plant referred to by Mr. Andrews, which was given to Dr. Meller from the Bourbon Museum as authentic *H. unilaterale,* "named by Bory de St. Vincent himself," and that they clearly do not belong to *unilaterale* at all, but to *H. gracile*, of Bory, which occurs both in Bourbon and the Mauritius, a plant which, though rather like *tunbridgense* in general habit, differs from it by the segments being destitute of serration (as Mr. Andrews has noted), and in the position of the sori and shape of the involucre. The original description of *unitaterale* by Willdenow (Sp. Plant. v. 522) from Bory's specimens is a tolerably full one; and if Mr. Andrews will compare his plant with this he will, I doubt not, see clearly that two very different species have been confounded together, probably by some accidental transposition of labels. We have no specimen at Kew of any *Hymenophyllum* with serrated segments from Bourbon at all, and only one from the Mauritius, gathered by Captain Carmichael long ago, and that has a distinctly toothed involucre, and in this way differs from *unilaterale* as Willdenow describes it just as *tunbridgense* differs from *Wilsoni.* So far as the description of *unilaterale* goes, it fits our English *Wilsoni* very well. *H. Boryanum* is very different from either *gracile* or *unilaterale*, much stronger, and more compound than either when properly developed, with hairy surfaces, and copious compound, round, terminal sori.—J. G. Baker.

Cyperus fuscus.—In the last number (p. 148) Dr. J. E. Gray impugns the character of the above little plant as a native Englishman, but I am at a loss to know on what grounds. Its Middlesex habitat may possibly not be an indigenous one, but what reason have we to suppose that it was "probably also sowed" in its Godalming habitat, Shalford Common? I have gathered it there myself, and there is nothing to indicate its not being native. In Brewer's 'Flora of Surrey,' it is also stated to have been gathered there earlier by Mr. J. D. Salmon; and neither Mr. Brewer nor Dr. Hooker, in his 'Students' Flora,' throw any doubt on its nativity. Nor does its geographical distribution render it in any way improbable that it should be a British plant.—ALFRED W. BENNETT.

[Dr. Gray informs us that he founds his opinion on the fact that the old Botanical Society, which made frequent excursions to Shalford, never detected *Cyperus fuscus* there, and states that the tradition that it was sown, though it would be hard to legally prove it, is sufficiently credit-worthy to throw doubt on a plant found in a single locality, and that only within very recent times.—EDS.]

I can aver that my departed friend, Salmon, did not introduce *Cyperus fuscus* at Shalford; indeed, he took some considerable pains to ascertain its history. It was not introduced by the gentleman whom he suspected to have been the means of its introduction. I believe it to be as truly native there as at Chelsea. Few people are aware of the difficulty of naturalizing plants: I suspect that nature has more to do with the distribution of foreign species than human agency; but whether this be so or not, I can affirm that neither the late Mr. Salmon nor the gentleman he suspected had anything to do with the introduction of *Cyperus fuscus* at Shalford.—ALEX. IRVINE.

BARBAREA STRICTA.—This year, I have found *Barbarea stricta* scattered for at least a mile along the Surrey bank of the Thames between Richmond and Kew, and have seen it also on the Middlesex side at Isleworth. It grows in a precisely similar manner to that in which it is found about the Ouse at York, where I used to see it regularly during several successive years, scattered at intervals amongst the rank herbage along the river bank, interspersed with at least an equal quantity of *B. vulgaris*. The petals are two lines long, half as long again as the sepals, by half a line broad at the tip, and, by their smaller size, more erect habit, and deeper colour (orange as compared with lemon) give it a different aspect from *vulgaris*, which readily catches the eye of any one who is looking for it. I have dried a supply of specimens for the Exchange Club.—J. G. BAKER.

ALYSSUM CALYCINUM, *L.*—This plant has not been recorded from the Isle of Wight since 1858 (*vide* Supplement to the Flora Vectensis, p. 135 of this volume, and the third volume of the 'Phytologist,' p. 290). I found on the 12th of May, 1871, one plant growing on St. George's Down, near Newport, on ground from which furze had been grubbed during the winter, but which was still in a very rough state. The evening was too cold to allow of a thorough search, and when I again visited the locality a second partial grubbing had been made, and I did not succeed in finding any other specimens.—FRED. STRATTON.

SHROPSHIRE PLANTS.—*Veronica Buxbaumii*, Ten. This plant was found at Upton Magna, four miles from Shrewsbury, between the village and the railway station, by the Rev. W. A. Leighton and myself in April last. It is recorded in one station only in the 'Flora of Shropshire,' near Oswestry. From the situation in which we found it growing, there could be little doubt it was an importation of recent date.—*Galium erectum*, Huds. I found this plant, which is new to Shropshire, in a meadow forming part of the racecourse at Judas Butts, Shrewsbury, in the beginning of May, but not then in bloom.—W. PHILLIPS.

MORCHELLA CRASSIPES, *Pers.*—This Morel, which was first recorded and described as British in the sixth volume of this Journal, page 1, has been found in two localities in the Isle of Wight, viz. Westover Park and Marvel Copse. It was first noticed by the children of the Rev. R. Nutt, M.A., Curate of Carisbrooke, who afterwards accompanied me to the locality at Westover. There, and also at Marvel Copse, numbers of these immense Fungi were still standing, though at that date, the 15th May, we were not able to find any specimens which were not much past their prime. At Westover, the Fungus grows in the half-wild shrubberies in the Park, chiefly in the shade; and at Marvel Copse on hedgebanks, in a much more exposed situation. In both places simply on the soil, and not apparently on dead or decaying wood or vegetable matter. The average height of the specimens was about ten inches, but probably they were taller when in perfection.—FRED. STRATTON.

A single specimen of large size was found in Mr. Alfred Smee's garden at Hackbridge, Surrey, growing in company with *M. esculenta* and *M. semilibera*. Several specimens of great size were found in May, 1871, by the late Mrs. Gulson, of Eastcliff, Teignmouth, at the tunnel cover close to Hawkesyard Park, Rugeley, Staffordshire. One plant was 11 inches high, with a diameter of 7½ inches, and a stem 15 inches in circumference. I have also found it near Ware.—W. G. SMITH.

TRICHOMANES RADICANS (p. 174).—In continuation of my note on this as British, I record that a fresh frond was sent to me a few days since, stated to be from a plant which was collected in Yorkshire in a perfectly wild state and locality, and which is now growing in a garden at Wallington. The exact locality is withheld, but I am told it is *not* the old one where Richardson and Hudson collected their specimens. I am unable to vouch for anything more of this account than that the frond sent to me is undoubtedly that of *Trichomanes radicans*.—HENRY TRIMEN.

PYRUS COMMUNIS, *Linn.*, var. BRIGGSII (Syme, Rep. Lond. Bot. Ex. Club), 1870.—For some years past I have known and observed the form of *Pyrus communis* growing near Plymouth which Dr. Boswell Syme has thus provisionally named, and am able to add a few particulars respecting it to those given by him in the Bot. Ex. Club Report for 1870, reprinted, after revision by its author, in Journ. Bot. Vol. IX. pp. 180-187. I have found this form only in the one "hedge between Thornbury and Common Wood," but there it occurs in three or four spots, and there are altogether about a dozen bushes of it, 10-12 ft. high. They are rather more shrubby and crab-like in appearance than are most of the examples of the so-called "Wild Pear" that I have seen about Plymouth. Dr. Boswell Syme errs in supposing this variety not to be spinous, for at least the lower branches are plentifully furnished with spines. What is very remarkable is the late period—the beginning of May—at which it flowers, corresponding as to this, not with our Pears generally, which are in blossom quite a fortnight or three weeks before, but with the Apple and Crab, or being a few days later than the last in unfolding its petals, which are often prettily tinged with pink on the outside. This spring it has bloomed very freely, and I have secured a supply of specimens for the next distribution by the Club. The elongation of the rachis of the cyme, mentioned by Dr. Boswell Syme, seems a constant character, as well as the densely woolly calyx. Although this occurs in a hedgerow away from houses, yet I do not regard it, or any other form of *Pyrus communis* growing about Plymouth, as indigenous, for I have never met with the Wild Pear in a wood or copse ; and even when it occurs in hedgerows, it is often as a single bush. It is, moreover, uncommon ; for a dozen years' botanizing in the neighbourhood of Plymouth has revealed it to me at only about as many stations.—T. R. ARCHER BRIGGS.

STRATIOTES ALOÏDES IN CENTRAL CHESHIRE.—A curious instance of the appearance, diffusion, and subsequent extinction of *Stratiotes* occurred on Tabley Lake, near Knutsford, the history of which may be worth putting on record, as bearing upon the question of the nativity of this local species in Britain. A shallow arm of Tabley Lake was, some twenty-five years ago, completely choked up in places with the Water-soldier. The passage of the pleasure boats was much impeded, and fishing rendered difficult. This lake is an artificial piece of water, covering many acres, made early in the present century. It was originally stocked with fish from many of the surrounding pits and meres,—a natural enough way for *Stratiotes* to have arrived also, since the plant is widely, though thinly, distributed through all the adjacent district. At Booths, Alderley, and Wincham I have personally observed it, while local Floras increase this list of contiguous stations. Any one, therefore, who wishes to investigate the claims of *Stratiotes* to be a native of this country, will do well to visit the plain of Central Cheshire. With regard to the Tabley *Stratiotes*, the plant was forty years ago so obnoxious that the trustee of the property, an ardent angler, caused an iron grating about 30 feet wide to be erected at a point where the lake runs through into a piece of water of lower level,—these expensive precautions being taken solely to prevent plants of *Stratiotes* being washed through and populating the lower water to the same extent which they had already done the upper ; a submerged "Water-pine" being an enemy most formidable to fishing lines. But I suspect that, as far as my memory reaches,—that is, some twenty-five years back,—*Stratiotes*, though still very abundant, had begun to wane in Tabley Lake. Fifteen years ago it had become scarce, and about ten years back the very last plant disappeared. I have reintroduced it into two of the park ponds. In each case some sixty or eighty plants have been the result in two years from some half-dozen imported specimens. This summer I have had no opportunity of visiting these ponds, which lie on each side of the "Serpentine" bridge ; but any of your Manchester readers who are passing in that direction will probably find them full enough just now of *Stratiotes* in flower. I think the local name "Water-pine" fully as felicitous as the more classical "Water-soldier."—J. L. WARREN.

Veronica triphyllos.—I have great pleasure in sending you a specimen of *Veronica triphyllos.* I found it in a Clover-field about a mile from Langley, Buckinghamshire. In the same field grew *Camelina* of two kinds, and two or three other plants I had never seen before.—E. C. White. [Mrs. White's specimens of *V. triphyllos* are very luxuriant, 6 or 8 inches high. There can be little doubt that the plant was, as well as the *Camelina* and other strange weeds, sown with the Clover. The locality has been accidentally but erroneously recorded as "near Ealing, Middlesex," in the 'Gardeners' Chronicle' (1871), p. 674. The plant has not yet been noticed in that county.—H. T.]

Right-handed *v.* Left-handed.—In the March number of this Journal (p. 78) I brought before the notice of readers the great want of uniformity in accent in botanical names which obtains, even among the masters of the science. I now lay before them a confusion in the use of the above terms recently brought under my notice. At the May meeting of the London Mathematical Society, Professor Clerk Maxwell requested information from the members as to the convention established among mathematicians with respect to the relation between the positive direction of motion along any axis, and the positive direction of rotation round it. Stating the conventions in use amongst the rival sets of writers, he illustrated his remarks thus: in the writings of the one set the positive directions of translation and rotation are connected as in a left-handed screw or the tendril of the Hop; in those of the other set, they are symbolized by an ordinary or right-handed screw or the tendril of the Vine; and he refers to Linnæus ('Philosophia Botanica,' 1757, p. 39), where, speaking of the trunk, he says, "Caulis . . . spiraliter ascendens. . . . *Sinistrorsum* ☾ secundum solem vulgo: Humulus, Lonicera, Tamus. *Dextrorsum* ☽ contra motum solis vulgo: Convolvulus, Phaseolus," etc. Mr. Maxwell states also that De Candolle was the first botanist who, in 1827, has decided otherwise, and that many botanists have been led astray and perverted by him. (I am not acquainted with the references upon which this statement is founded.) Now it may not be of much importance to botanists how this question is settled, but it is, as Mr. Maxwell showed, of some considerable importance to mathematicians. "In pure mathematics little inconvenience is felt from the want of uniformity, but in astronomy, electromagnetics, and all physical sciences, it is of the greatest importance that one or other system should be specified and persevered in. The relation between the one system and the other is the same as that between an object and its reflected image, and the operation of passing from the one to the other has been called by Listing *perversion.*" The upshot of the discussion was that, in consequence of the arguments of Sir W. Thomson and Dr. Hirst in favour of the right-handed system derived from the motion of the earth and planets, and the convention that the north is to be reckoned positive, the right-handed system,—symbolized, as Professor Maxwell expresses himself, "by a corkscrew or the tendril of the Vine,"—was adopted by the Society. (Cf. Report of the Meeting in No. 82 of 'Nature.')—R. Tucker.

Extracts and Abstracts.

CHINCHONA PLANTATION IN JAMAICA.

According to the reports of 1870, published in the Jamaica papers, the progress of the 40 acres of chinchonas, planted at the end of the year 1868 continues satisfactory. The tallest plant of *Chinchona officinalis* is 11 feet, of *C. succirubra* 9 feet, and of the other species 8 to 9 feet. The circumference of the stems near the ground of all the species, except *C. officinalis*, which is of more slender habit, is from 10 to 12 inches (double of what they were twelve months ago). The writer of the reports continues:—I speak of the finest specimens in the plantations, but all the others have made proportionate progress. The diameter of the branches from side to side in some of the best plants is over 6 feet. These plants had withstood the severe drought, which lasted nearly five months, in the most satisfactory manner. The opposite extreme of wet weather has prevailed in the past year. From the beginning of August till the end of the year it rained, on an average, four days a week. I was not in a position to keep a record of the rainfall, together with other meteorological observations of the past seasons. By way, however, of indicating the excessive rainfall experienced in these months, I would remark that the extraordinary fall of 24 inches occurred in thirty hours on the 17th and 18th of November. From this and other isolated measurements I have reason to believe that during the five months above referred to, the rain-fall must have considerably exceeded 150 inches. Frequently recurring with the rain-fall violent winds prevailed, which, in these altitudes, almost approach to a hurricane, but from which the plants have sustained little injury. The incessant rains, however, have caused several landslips, sometimes forming gullies to a depth of about 12 feet, cutting across roads, thereby necessitating the alteration of their course to the extent of nearly a mile. The total damage done to the plantations in this way, and the consequent rolling of huge stones and roots down the steep mountain slopes, has resulted in the loss of about 500 to 600 trees. When, however, it is borne in mind that this has been an exceptionally rainy year, and that the land is steep in some place, and newly under cultivation from a state of nature,—the surface denuded, the forest roots decaying, and the soil loosened, the powerful action of tropical rains may be easily conceived, and the extent of injury must be considered as, under these circumstances, trivial. The plants have thus passed satisfactorily the ordeal of two years, exhibiting the most marked extremes of seasons to which tropical countries are liable.

The 40 acres of forest land, alluded to in my report for 1869 as having then been prepared for the extension of the plantations, were planted out, except 10 acres in December, 1869, in the months of February, March and April. The plants were placed 6 and 7 feet apart, which gives approximately 1000 plants per acre—40,000 plants. The average height of these plants is now 2 or 3 feet, in a healthy and promising condition. The principle of planting 6 and 7 feet apart—the previous year's planting being 10 feet apart—has occurred to me from a similar system of close planting recently adopted in the chinchona plantations of India, there, indeed, planted 4 and 5 feet apart. The prospective result of this close planting is the securing of rapid returns; a few years sufficing to cover the intervening spaces. Each alternate tree is then cut down and the bark sent to market. The operation of cutting down makes room for the spread of the surviving trees, which in a few more years again approach and impede each other, and in like manner have to be thinned as before. This extremely thick planting of trees is objectionable, inasmuch as the trees possess a spreading habit. For example, those planted at 5 feet or at 7 feet apart occupy the interspaces in three or four years. At this state of growth the plant would hardly, I conceive, be worth stripping, as the yield per plant, probably, could not exceed one pound of dried bark (value, say 2*s*.). Whereas trees six or seven years old, under favourable circumstances, must each yield five or six pounds of dry bark. On the other hand, however, this system of thick planting has its advantages. The close planting costs but little additional, and the plants are readily propagated. When found too close, they are easily cut down to allow for the expansion of the remaining trees. When thus planted close they keep down the weeds, and hence their culture expenses are lessened.

The entire area of ground planted with chinchonas is nearly ninety acres. The severe rainy weather of the past year prevented the enlargement of this area by at least 20 acres, for which plants were in readiness. Including these 20 acres, about 80 acres of the forest were felled and partly cleared for the extension of the plantations. This land will be completely prepared for the reception of the plants in a few months.

In May I hope to have 40 acres planted—about 1000 plants per acre, with *C. succirubra;* and near the end of the year the other 40 acres, together with 50 additional acres proposed to be cleared, planted with *C. Calisaya*, the two most precious species. The number of plants permanently planted out is 60,000; the number of seedlings in pots 40,000, and of seedlings in nursery beds 10,000—total, 110,000. I had intended that the plants required for the extension of the plantations, to the extent of 130 acres, above alluded to as under preparation for being planted out in the year 1871, would be propagated chiefly from cuttings. But most fortunately two fine trees, at Cold Spring, of *C. succirubra*, one of which is a magnificent tree nine years old and 30 feet high, yielded seeds for the first time in Jamaica, from which, through the generosity of Mr. John M'Lean, I procured, in the beginning of September, nearly 50,000 excellent seeds; the result being now 40,000 healthy seedlings. Better plants are produced by seeds than from cuttings. Several young trees in the Government plantations have a good crop of seeds ripening, and others are coming into flower. The number of seeds likely to be obtained from these young trees in a few months can hardly be under 100,000. Thus the 50,000 seedlings in course of treatment, and those now ripening on the trees, will suffice to plant all the land proposed to be prepared to the end of 1871, making a total of 220 acres containing about 200,000 plants.

I expect shortly to submit samples of chinchona bark, of the different kinds, to the island chemist for analysis, in order to ascertain the percentage of alkaloid, more accurately performed when the bark is in a fresh state. It has been discovered that the sun's rays, falling on the bark while in a green state, is prejudicial to alkaloids.

ORCHILLA.

Orchilla of a fine quality has been discovered in Lower California. An expedition is fitting out at New York to gather orchilla in its newly found south-western home. What *is* orchilla, that California papers should crow over its existence in that long peninsula, and why should it be thought a good speculation to ship 300 men, women, and children from New York, passage free, to go out there and gather it? We will answer these questions. Orchilla weed, orchella, orchal, or archil—for by these divers names it is known—is a lichen, which yields a beautiful violet-reddish dye. It is used to some extent for colouring silks and woollens, and has only the fault, but a serious one, that it lacks permanence. Notwithstanding that defect, it is still an article in request among dyers, and its production hitherto being limited, commands good prices. Its principal sources of supply for Europe are the Canary and Cape de Verde Islands, Barbary, and the Levant; to these have been recently added Ecuador, Peru, and the Gallapagos Islands. Those who glance over the tables of imports must have observed it now and then appearing among the items along with annatto, argols, divi-divi, garancine, meliothe, safflower, and other herbs, roots, woods or gums of outlandish names. Last year this country imported $14,900 worth of orchilla weed, and $4700 worth of orchilla liquor or tincture. Its value in England, which is its principal market, varies greatly from time to time. In seasons of scarcity it has been as high as £1000 per ton; but is now quoted at 26*s*. to 66*s*. per cwt., according to quality. It grows on bushes and stones near the sea; and in some regions so abundantly that a quarter of a ton may be picked by one person in a day, a profitable business if it could be kept up at present prices. Of the profusion and the quality of orchilla in Lower California we avouch nothing from our own knowledge; but it is probably not inferior to the Old World article, since that from Ecuador, on the Pacific coast, is said to be fully equal, if not superior, to its European and African competitors. Still less would we like to commit ourselves to an endorsement of the novel enterprise of shipping colonies from New York to hunt for this valuable lichen in Lower California. They go out, we understand, at the expense of a Guayaquil house, which makes a speciality of the orchilla trade, though they are under the patronage of the Lower California Company, which has an interest in populating the peninsula. Not having been fortunate as yet in inducing emigration to that region, the Company may think themselves lucky if orchilla, at fabulous prices per ton, should attract settlers there. On this point we have nothing but to quote the assurances of California papers that it abounds along the coast, that it is not uniform in quality, and that experience and skill are necessary in gathering it to obtain the better and only saleable kinds. Incidentally, we may mention that the increased consumption of orchilla in Europe as a substitute for cochineal is said to have affected the value of the latter production. A subsidiary use of orchilla is, in its alcoholic infusion, as the red liquid in spirit thermometers.—*New York Journal of Commerce, March 4th*, 1871.

ON HIPPOCRATEACEÆ.

We are glad to be enabled to give the following abstract of Mr. Miers' important paper, read before the Linnean Society on June 1st, based on a long and laborious examination chiefly of the South American species of the Order. The history of the family shows the widely-divergent opinions of numerous botanists in regard to its affinities,—the absolute want of knowledge to guide these opinions at last culminating in the extinction of the *Hippocrateaceæ* by the authors of the new 'Genera Plantarum,' who have reduced it to a mere tribe of the *Celastraceæ;* and not only so, but have amalgamated the several genera previously established into two, viz. *Hippocratea* and *Salacia*. The large amount of evidence here presented will, however, show its right to stand as a distinct Natural Order, having, in fact, little connection with *Celastraceæ* in any well-digested system of arrangement.

The chief characters in its floral structure consist in having 5 sepals, 5 alternate petals imbricated in æstivation, and only 3 stamens (very rarely 5); the most important feature is the hypogynous disk, variable in shape, but constantly placed between the stamens and petals; the ovary is always superior, usually 3-locular, with definite anatropous ovules fixed in the axis. The mode of growth of the ovary varies greatly, and on these differences of development the author divided the family into three separate tribes:—1. *Hippocrateæ*, where, in the progress of growth, the axis of the ovary never lengthens, remaining completely atrophied, the cells growing upwards vastly, sometimes to a hundred times the length of the axis at the maturity of the flower, thus producing 3 distinct capsules from a single ovary, which sometimes open 2-valvately and have winged seeds, or are indehiscent, with nuciform seeds borne upon a carinated or alar support: upon such differences five several genera are established. 2. *Tonteleæ*, distinguished by a drupaceous fruit, often of large size, the growth of an ovary wherein the axis lengthens commensurately with the cells, the fruit being thus 3-locular, with several seeds, which in most cases are covered by an *arilline*, a fleshy complete coating, resolving itself into a mucilaginous pulp that envelopes the seeds: this tribe consists of eight genera. 3. *Kippistiæ*, remarkable for a floral development hitherto unknown among Dicotyledones, but long ago described by Mr. Robert Brown in Monocotyledones; here the stigmata, instead of alternating as usual with the stamens, and standing opposite to the cells of the ovary, are opposite to the stamens, and alternate with the cells of the ovary; the fruit is drupaceous, variable in the position of the seeds, but with characters resembling those of *Tontelieæ:* this tribe consists of three genera. There are thus seventeen genera in all, with well-marked characters, which were separately illustrated by as many drawings, each amply explained by analytical figures. The numerous facts here shown in regard to structure are, for the most part, hitherto undescribed, many being derived from analyses made of plants in the living state. In summarizing these details, the author pointed out the many salient points of distinction in the structure of *Hippocrateaceæ* and *Celastraceæ*.

1. In the former, the stamens are generally anisomerous in regard to the petals (3 to 5); in the latter, they are constantly isomerous, with stamens equal to, or double the number of the petals.

2. In the former, the stamens are distinctly inserted *inside* the disk; in the latter, they are invariably inserted *outside* the disk.

3. In the former, the anthers, generally of a peculiar form, are constantly extrorse; in the latter, they are of the usually normal structure, and always *introrse.*

4. In the former, the disk is generally elevated, and presents a free wall of separation between the stamens and more external parts; in the latter, it is a mere expansion of the torus, intervening between the ovary and all other floral parts.

5. In the former, the sepals, petals, stamens, and disk are persistent at the base of the fruit, and are never seen in such position in the latter family.

6. In the former, the superior ovary is always elevated above the torus, and quite free from it; in the latter, it is always more or less partially imbedded in the disk, and half agglutinated with it.

7. The atrophied condition of the axis of the ovary, though not a constant feature, is one quite peculiar to the *Hippocrateaceæ;* and on the other hand, in *Celastraceæ* we find no growth at all approaching the several kinds of large drupaceous fruits seen in the *Hippocrateaceæ.*

8. In the development of the seeds there is a constant distinction. In *Hippocrateaceæ* they are invariably without albumen; in the *Celastraceæ*, the embryo, without exception, is enveloped in albumen, usually copious. In the former, the cotyledons are often closely conferruminated in a solid mass, a circumstance quite unknown in the latter.

9. In the *Hippocrateaceæ* no trace of an arillus can be seen; in *Celastraceæ*, though not universal, a distinct *arillus* in most cases partially surrounds one extremity of the seeds. In the former, in one tribe, the seeds exhibit a greater or smaller expansion of the testa, in the shape of a large membranaceous wing, or a narrower alar keel, while in the two others they are invested by an *arilline*, an entire fleshy coating, the nature of which Mr. Miers explained many years ago,—a feature seen in some other families, though too often unnoticed by botanists.

10. In the *Hippocrateaceæ*, the leaves, but more particularly the branches of the inflorescence, the pedicels, sepals, petals, contain numerous white elastic threads, which hold the parts together when broken; and these spiral threads often extend to the pericarps, to the integuments of the seeds, and even occasionally to the fleshy cotyledons. Nothing of this kind has yet been observed in *Celastraceæ.*

Any one of these peculiarities, by itself, would tend little to support any separation of these two families, but the sum of the whole tells powerfully to mark a great distinction in their organization. The only arguments that have yet been urged for their near affinity are that both generally consist of arborescent plants, with evergreen leaves, an axillary inflorescence, petals and sepals with imbricated æstivation, a 3-celled ovary, a simple style and stigma; but these are all characters common to many other families, distantly related, and wholly insufficient by themselves to establish any near affinity. The more probable inference is that these two families should be separated by a long interval.

New Publications.

Mycological Illustrations, being Figures and Descriptions of New and Rare Hymenomycetous Fungi. Edited by W. Wilson Saunders, F.R.S., F.L.S., and Worthington G. Smith, F.L.S., assisted by A. W. Bennett, M.A., B.Sc., F.L.S.

This is a work which will be cordially welcomed by all British mycologists. The authors propose to publish a series of coloured figures of British Hymenomycetous Fungi, to be confined principally to such as are new or rare, but to include occasionally other species which, although well known, may not have been hitherto satisfactorily figured. This first part consists of 24 plates, containing figures of 30 species, of which 18 belong to the genus *Agaricus*, 6 to *Cortinarius*, 1 to *Lactarius*, 1 to *Coprinus*, 1 to *Gomphidius*, 1 to *Cantharellus*, and 2 to *Boletus*. To those who are acquainted with the artistic powers of Mr. Wilson Saunders and Mr. W. G. Smith, it is hardly necessary to say that the figures are excellent. Of the 30 species drawn, 14 have not been figured before, and some others only in works by no means easily accessible. There is little to be said by way of criticism. A few remarks only have suggested themselves in looking through the text and plates. *Cantharellus radicosus* (pl. 1) shows, in a marked manner, how deceptive a character size may be without the examination of a large series of specimens. This plant was described in the 'Annals of Natural History' (1866) as having a pileus three-fourths to one inch across. The pileus of the largest plant shown on this plate is nearly three inches in diameter, and the authors state that some specimens found in Epping Forest were much larger than any they have figured. The pure glutinous white of *Agaricus mucidus* can hardly be shown in a drawing. Specimens occasionally occur having the dark tint shown in plate 5, fig. 2; but the foxy tinge of the pileus, stem, and ring in fig. 1 leads to the supposition that the drawing was made from specimens past their prime. The same remark applies to *A. lignatilis* (pl. 6, fig. 4), the cold dead white of which is as difficult to represent as the slimy pileus of *A. mucidus*. Some of the fungi figured are of considerable beauty, and of these the most striking are, perhaps, *Gomphidius glutinosus* var. *roseus*, *Cortinarius dibaphus* and *cærulescens*, and *Boletus calopus*. *Coprinus lagopus* also is extremely elegant. A few places will be found in which the text and the plates are not quite in accord, and to which it may be worth while to call attention. The gills of *Agaricus sinapizans* and *Cortinarius stillatitius* are described as emarginate, but the sections (plates 2 and 3) do not exhibit this structure, and the same remark applies to *Cortinarius caninus* (pl. 15). The stem of *Boletus pachypus*, as shown in the drawing (pl. 17), cannot be called reticulated. In *Agaricus dispersus* (pl. 24) the stem is described in the text as about two inches long, but if the stems in the drawing are measured, they will be found to be very nearly seven inches in length. It may be doubted whether the pileus in *A. hydrophilus* is not rather too darkly-coloured; but it is stated that the specimens were gathered after much rain, which may account for a departure from the normal tint. In conclusion, it is much to be hoped that this most useful and interesting publication may meet with sufficient support to enable its energetic editors to issue further parts in quick succession. F. C.

Proceedings of Societies.

LINNEAN SOCIETY.—*June 1st*, 1871.—G. Bentham, Esq., President, in the chair. Mr. J. C. Melvill exhibited specimens of *Siler trilobum*, Scop., collected by him near Cherry Hinton, Cambridge; and stated that he believed it to be a native there. (See p. 211.) The following papers were read:—"Notes on Northern Chinese Plants," by H. F. Hance, Ph.D. The paper consisted of notes on, and descriptions of, about 70 species, 12 of which were new, including two species of *Oxytropis* and *Orobanche*, two *Carices*, etc. "On the *Hippocrateaceæ* of South America," by John Miers. (See p. 220.)

BOTANICAL SOCIETY OF EDINBURGH.—*May 11th*, 1871.—Alexander Buchan, Esq., President, in the chair.—The following communications were read:—"On the different Plants used as Ipecacuan," by Professor Balfour. The plants described were *Cephaelis Ipecacuanha*, *Psychotria emetica*, *Richardsonia scabra*, *Ionidium Ipecacuanha*, *Manettia cordifolia*, *Euphorbia Ipecacuanha*, *Polygala Poaya*, and *Tylophora asthmatica*. The paper was illustrated by drawings, dried and living specimens of the plants referred to, and microscopical preparations. "On the *Ericaceæ* of the Dominion of Canada and adjacent parts of British America." By Professor George Dawson.

June 8th.—Alexander Buchan, Esq., President, in the chair. The following communications were read:—"Biographical Notice of the late Mr. William Wilson," by Mr. James F. Robinson. "On Tea-manufacturing in India," by Mr. William Bell. Professor Balfour recorded the occurrence of *Sisymbrium Columnæ* on the banks of the Water of Leith, near Colinton, where it had doubtlessly been introduced with material brought to the paper mills in the neighbourhood. He also noticed *Allium Schœnoprasum* near Colinton, and *Lysimachia thyrsiflora* in the canal in several places near Edinburgh. Prof. B. exhibited a large flowering specimen of a species of *Dorema*, which had been sent to the Royal Botanic Garden by Mr. Loftus, from Persia.

Botanical News.

Mr. E. D. Harrop records the occurrence of *Phyllactidium pulchellum* (see Journ. Bot. Vol. IV. pp. 225, 370), Kütz., in Tasmania, and in the monthly Notices of the Royal Society of Tasmania for 1869, gives a lengthened description of the plant. In the same Notices for 1868, he gives a list of the known *Desmideæ* of Tasmania.

Dr. Rabenhorst describes a new genus (*Seirosporium*), and several new species of Fungi collected by Haussknecht in the East, in the Dresden 'Isis' for 1870.

A continuation of Mr. Broome's paper on the Fungi in the neighbourhood of Bath, reviewed in our last volume (p. 360), is included in the Proceedings of the Bath Natural History Club, vol. ii. 1871.

Ferd. von Müller gives a list of 74 plants new to the Tasmanian flora in the monthly Notices of the Royal Society of Tasmania for 1868.

Dr. Seemann has again left England for Nicaragua.

The volume for 1870 of the "Transactions of the Woolhope Naturalists' Field Club," just issued, fully sustains the high character of its predecessors. As our readers are aware, the strong botanical point of the Club is Fungology, and this volume contains a paper on the larger Fungi of trees, by W. G. Smith, giving separate lists of species for different trees and shrubs, an account of *Scleroderma Geaster*, by Mr. Broome (which has already appeared in our pages), and notes on fairy rings, by Mr. Buckman. Dr. Bull also continues his "Illustrations of the Edible Fungi of Hereford," and gives coloured drawings of *Boletus edulis*, *Hygrophorus virgineus*, and *H. pratensis* and *Lycoperdum giganteum;* and Mr. Renny contributes a translation of E. Fries' 'Historiola Studii mei Mycologici,' illustrated by a photograph of the Swedish fungologist. The other botanical papers are:—notes on the growth of Mistletoe, by the Rev. R. Blight, with somewhat rough but apparently truthful illustrations; on the more rare plants of the Longmynd Hills, Shropshire, by Dr. G. H. Griffiths; on some Algæ only apparent in times of drought, by Mr. Edwin Lees; and also many notices of remarkable trees (illustrated by photographs), besides records of localities of rare species scattered through the volume. The botany is but a portion of the book, which is most creditable to the club, and acceptable to working naturalists.

We regret to have to announce the death of Carl Theodore Hartweg, Director of the Grand Ducal Gardens of Swetzingen, in Baden, and well known in England as Collector of the Royal Horticultural Society, in Mexico and other American republics. Born on the 18th of June, 1812, at Carlsruhe, he died on the 3rd of February, 1871, at Swetzingen, leaving several sons. Mr. Bentham's excellent 'Plantæ Hartwegianæ,' containing a description of the many new plants discovered by Hartweg, as well as Dr. Lindley's publications of Hartwegian novelties in the Botanical Register and the 'Gardeners' Chronicle,' will keep the memory of the departed alive wherever botany is cultivated.

A very useful enumeration of all the Cryptogams found in Venetia has been published in the Transactions of the Vienna Zoologico-botanical Society, and also issued in a separate form; the author is Count Hohenbühel-Heufler. The catalogue enumerates 53 species of Filices, etc., 264 Musci, 34 Hepaticæ, 503 Lichenes, 245 Fungi, 19 Characeæ, and 633 Algæ, with references to descriptions and a list of localities. The history of the knowledge of and additions to the Cryptogamic botany of the district is also carefully traced from Calceolarius in 1566 to the present time.

Professor J. E. Zetterstedt, of Jönköping, Sweden, a well-known botanist, is desirous of disposing of his duplicate specimens of Scandinavian plants—Phænogams, Mosses, and Hepaticæ. For particulars and terms apply to Dr. Stirton, 15, Newton Street, Glasgow.

Mr. Bentham's address to the members of the Linnean Society, read at the anniversary meeting on May 24th, has been printed in 'Nature,' and should be read by all botanists. In many respects it may be considered as the most valuable of the excellent series of addresses which have been given year after year to the Society by its President.

COMMUNICATIONS have been received from:—J. Sadler, W. Carruthers, G. C. Churchill, W. G. Smith, F. Currey, J. Miers, Mrs. E. C. White, T. R. A. Briggs, A. Irvine, J. F. Duthie, J. C. Melvill, Dr. H. F. Hance, Rev. J. E. Leefe, A. G. More, Hon. J. L. Warren, etc.

Original Articles.

ON HYBRIDITY IN SALIX, AND THE GROWTH OF WILLOWS FROM SEED.

By Rev. J. E. Leefe, M.A., F.L.S.

It would, I think, be interesting if such of the readers of the 'Journal of Botany' as have had opportunities of forming an opinion, would record their observations on the growth of Willows from seed. The whole theory as to the production of hybrids in this genus must depend upon their growth from seed. If they do not spring readily from seed, then the nice distinctions which separate closely allied forms, must be accounted for in some other way than by crossing.

The evidence on the subject seems to me as yet far from conclusive; still it is in some cases so positive that I by no means venture to say that seedling Willows are not to be met with. It is fortunate that, owing to Willows being so readily propagated by cuttings, little inconvenience will arise to cultivators should there prove to be generally a paucity of seedlings. I wish now, without bringing forward any theory on the subject, to mention what I have collected from books, or from inquiries amongst my botanical friends, or from my own observations as a collector of Willows now for many years. Wimmer adopts thoroughly the idea of hybrids, therefore of seedlings, but I am not able to quote his exact words, having failed, through the booksellers, to obtain a copy of his interesting work.* He says, I believe, that the great botanist Fries has to some extent become a convert to his views.

The late Professor Koch, in his 'Commentary on the European Willows,' anno 1828, p. 9, remarks "Non ea difficultas sola turbat botanicum in hoc genere plantarum, quæ in partium mutatione et vicissitudinibus cernitur, alia ei creatur molestia in hybridarum copiâ, quas in hoc genere exstare addubitari nequit." He then proceeds to instance the numerous forms growing near Erlangen, intermediate between *S. rubra*, Huds., and *S. viminalis*, L., forms partaking so much of the characters of both species as to make it difficult to refer specimens to one of these species rather than the other. I am indebted to the kindness of Prof. Koch for a most valuable collection of Willows grown in the arboretum at Erlangen, and, amongst the rest, for a specimen of one of the forms above referred to. I should myself consider this particular specimen to be a remarkably pubescent state of *S. rubra*, Huds., which the catkins appear most nearly to resemble, while the pubescence of the leaves does not show the silkiness of the viminales. I do not know how far Prof. Koch retained to the last his early views as to the hybrid growth of Willows. In his 'Synopsis,' bearing date 1837, there is no allusion, I think, to hybrids between the species above mentioned. Moreover, whether or no Fries has of late adopted, even partially, Wimmer's very pronounced views, I have not the means of knowing; but in his 'Mantissa,' extending to the year 1842, pp. 559–60, he combats this view. "Innumeras porro vidi Salices hybridas dictas; an ulla vero certâ experientiâ hybrida sit comprobata, equidem nescio?" At p. 100 he observes, 'magis vero perniciosam censemus nimis credulam determinationem varietatum et levium formarum pro hybridis, quâ laxa speciei idea celata, indeque sæpe ignorantiæ refugium.' Thus it appears that at the date of the 'Continuatio Floræ Suecicæ,' 1832–1842, Prof. Fries did not regard with favour the view that slight differences between closely allied Willows are due to hybrid intermixture. This does not, however, indicate what Prof. Fries' opinion is as to the growth of Willows from seed.

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* Noticed in Journ. Bot. Vol. IV., pp. 383–386.

Turning now to another quarter, it is not a little remarkable how positive in the affirmative was the language of the late Sir J. E. Smith, *first*, that Willows do grow readily from seed; and *secondly*, that the seedlings were always true to their kinds. Speaking of Mr. Crowe's garden, Eng. Fl. vol. iv. p. 164, he says, "Seedlings innumerable springing up all over the ground, were never destroyed till their species were determined and the immutability of each verified by our joint inspection. This was the more material to set aside the gratuitous supposition of the mixture of species, or the production of new or hybrid ones, of which, no more than of any change in established species, I have never met with an instance." Such statements from such a quarter must demand the utmost attention. Perhaps the seedlings, as they sprang up, were removed to beds prepared for them, otherwise one cannot but be struck by the practical difficulty of keeping the ground clear of weeds without destroying the young plants. Two years' growth, at the very least, would be required before the species of the seedlings could be determined, and in that time, unless the seedlings were transplanted, which is not stated, the Willow ground must have been in great danger of becoming a wilderness.

On the same subject, Reichenbach, Fl. Excursoria, p. 173, remarks "absque dubio specierum enumeratarum quædam hybridæ." Wishing to ascertain the opinions of competent persons, I have consulted some of my friends who have bestowed much attention upon this tribe. The Rev. L. Darwall, who has long cultivated Willows, observes, "Amongst seedlings I have never found any but *S. caprea* and *S. aquatica* (including, perhaps, *S. cinerea* and *S. oleifolia*), though I have both sexes of many other species. With this the opinion of my friend Mr. James Ward, who has specially studied the Willows for a long series of years, substantially coincides. Prof. Balfour tells me that they have tried, without success, to raise willows from seed in the Edinburgh Botanic Garden. To come now to my own experience; excepting *S. caprea*, I do not ever remember to have met with a Willow where it looked like a seedling, and this was in the shrubbery at Audley End, Essex, where the plant might have been inserted as a cutting by some one of the gardeners. I have myself cultivated the Willows somewhat extensively since the year 1838. First in the nursery garden at Audley End for about five years, then in the Rectory Gardens at Bishopwearmouth, in the county of Durham, for say about four years, and for a year more in a garden in the neighbourhood of the town of Sunderland, lastly, for fully twenty-one years at Cresswell. For the last twenty-one years the plants, some of them now trees, have been growing under my own eyes, great care being taken to keep them properly labelled, which is no easy matter. In all that time I have never seen a single seedling, though my collection comprises fully one hundred forms. It is, I admit, barely possible that seedlings may have sprung up, and been destroyed in keeping down weeds, but if so, I cannot account for their not occurring in undisturbed parts of the garden and grounds, amongst shrubs and trees, where seedling Sycamores are frequent, and plants of the *Leycesteria formosa* have several times sprung up. A few years ago I collected and sowed some seed in pots in my greenhouse, and kept them carefully watered and looked after, but the seed did not vegetate. Last year (1870) I made a more systematic attempt, both to produce hybrids and raise Willows from seed. On the 11th of last August I sowed, in three boxes filled with good compost, seeds of the following kinds :—*S. Forsteriana* from Borrer; *S. Andersoniana*, Borrer; *S. Doniana*, Borrer; *S. Smithiana*, E. Bot. *S. Smithiana* growing in the middle of a large bush of a monandrous Willow allied to *S. Lambertiana*, Sm. I also carefully tied a bunch of the male catkins of *S. daphnoides*, Vill., to a branch of a female of *S. pomeranica*, W., dusting the stigmas at the same time with the pollen. In a similar manner I endeavoured to fertilize the female of *S. stipularis*, Sm., with the pollen of the male of *S. rugosa*, Borrer; also the female of *S. Pontederana*, Sch., with the catkins of a beautiful Willow gathered near Rothbury in Northumberland, which I take to be the male of that species. The third box was filled with seed of different forms of *S. repens*, L., including, probably, *S. ambigua*, Ehrh., sent to me by a friend from Horncastle in Lincolnshire. On all those branches, the catkins of which I endeavoured to fertilize artificially, seed was produced in abundance. The boxes were carefully watered all through the summer, and in winter were placed in a cold frame. I have examined them constantly up to the present time, and at first thought that some of the seeds springing up in them would prove to be Willows, but in this hope I have been disappointed, and now fear that the experiment has again been a failure. Last year the seed of the Willows was more copiously produced than usual, and became rather an annoyance in the beds and walks, but I have not seen a seedling anywhere. Although, then, I dare not say that Willows are never produced from seed, I think it is clear that this happens less frequently than is commonly supposed. My garden is about a mile and a half from the sea, and rather exposed to the north and north-west; but the soil is good (old grass land), and most of the Willows grow freely in it. I have lost far more kinds from crowding than from climate.

Having thus failed myself, I would invite the remarks and co-operation of others who, in more favourable and southern situations, may be more successful than I have been in raising Willows from seed.

THE FLORA OF HYDE PARK AND KENSINGTON GARDENS.

By Hon. J. L. Warren, M.A.

This paper will not interest botanists to whom the rarity of a plant is its main recommendation. We deal here with our common and widely-diffused species. We endeavour by a contrast of records, new and old, to show the surprising permanence of many species, even in the midst of the smoke and other hostile influences of a great city. We remind the town-botanist, whom want of time and cash will not allow many country excursions, that a fair section of his native flora may be seen at his very doors, and studied without the help of a railway-ticket. This list may also prove acceptable as an attempt to throw together the floral records of our chief London breathing-place, and as a means of bringing up to a modern date the occurrence in Hyde Park of many species, unconfirmed there since early in the present century or even an anterior one. All notice of trees is omitted in the present list. It might be interesting to give a list of such of these as have produced seedlings, as many have done; but it would hardly come within the scope of this paper to do so. In many flower-beds seedling *Rubi* occur, a curious commentary on an idea once held that *Rubus* was seldom propagated thus. There are also to be found in the 'Flora of Middlesex' some curious notes on the age and species of several trees in our limits. *Sambucus nigra* and *Salix viminalis*, *S. fragilis* and *S. triandra*, occur in the gardens, but their claims are slender to admission in our Flora. *Hedera*, *Cratægus*, *Digitalis*, etc., occur, but all clearly through human agency. The most interesting plants in Hyde Park grow mainly in two pieces of ground. One is a strip of turf, of no great extent, beginning north of the Magazine and lying between the Ring Road and the ditch bounding Kensington Gardens on the west. Here *Trifolium glomeratum*, *Ornithopus*, *Carex muricata*, etc., grow, and here *Moenchia* and *Cuscuta* used to be found. I call this ground "the strip" sometimes for brevity in my list. The other noteworthy slip of turf begins at the end of a black wooden wall which runs south of the barracks to near the Humane Society's Receiving House and the Deputy Ranger's House opposite the Serpentine. It consists of the site of a road now grassed over, and runs west towards the Magazine, say, for about two hundred yards. Here *Sagina ciliata*, *Plantago Coronopus*, *Festuca bromoides*, and *Trifolium filiforme* may be found without much trouble.*

It is most important in the present flora to specify, if the species was gathered in the open and apparently original turf, or whether it grew within the limits of artificial enclosure, in a flower-bed, in the circular hurdles used to protect the trees from sheep, or in newly-sown grassland. Plants in the first category alone (excepting, of course, the aquatics) ought *primâ facie* to be reckoned natives in this list, though plants which nearly always follow horticulture, like *Solanum nigrum*, may be just as native (or un-native) in a Kensington Garden flower-bed as in a Devonian cottage garden. What is meant may be shown by an example :—*Chrysanthemum Leucanthemum* within our limits is seen about thrice in open turf, twenty or thirty times under suspicious circumstances. Hence, without wishing to dogmatize, I incline to the opinion that this species is generally a casual in Hyde Park, however common a native it may be elsewhere. In fact, I would much rather, if possible, have omitted all notice in the present list of these flower-bed casuals, and newly-sown turf ephemerals, if I may use the expression. The plants of the genuine open park herbage are really the important matter in this record. What species, imported with garden-mould or grass-seeds, may manage to survive a month or two is quite of secondary importance. Our list of 'casuals' might doubtless, with constant observation for a season or two, be run up to 200 or 300 species, but such a list, even when completed, would afford us curious rather than valuable information; but, though I would gladly have disencumbered myself of these casuals, this list might mislead if this were done, since several species appear, I conceive, in the Gardens and in newly-sown places, in the character of casuals; and also in the Park turf in that of natives. *Chrysanthemum Leucanthemum* and *Plantago lanceolata* may be quoted as examples. Besides, in many instances, it is nearly impossible to say to which category a given species is to be referred; and, lastly, if we rigidly excluded flower-bed weeds, we should have to condemn such plants as *Veronica polita* and *Lamium purpureum*, which, as has been said above, are as much native here as in any provincial district. Thus, from the wish to enter no more plants of this kind than absolutely necessary, I have deemed it more technically correct to exclude, as literally just outside our limits, an interesting number of species observed on the Gore at Kensington by the authors of the 'Flora of Middlesex,' to which I beg to refer the reader. In conclusion, this list, which contains about 190 species, is manifestly imperfect. Conscious of this, I only hope its publication may induce some one to amplify and improve upon it. But I venture to trust that any botanist to whom this list is the means of indicating any Park rarities will refrain from rooting up specimens.

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* During a former residence in Cheshire, I made a careful list, through many years, of every species found within a mile radius of my dwelling-place. It is worth mention that several plants belonging to the present list were absent from my Cheshire enumeration,—*Trifolium glomeratum*, *Koeleria cristata*, *Sagina ciliata*, *Hordeum murinum*, *Hordeum pratense*, *Senebiera Coronopus*, and *Arenaria serpyllifolia*. The first three absences are likely enough, but the last four may surprise many a south country reader.

All my records of plants apply to the present summer (June and July, 1871) unless I distinctly specify otherwise. Later in the year such genera as *Bidens, Chenopodium,* and *Polygonum* would be more fully represented. All records beyond my personal observation are accompanied by the name of the authority, which is in nearly every case Trimen and Dyer's 'Flora of Middlesex.' The abbreviations used are,—Fl. of M.='Flora of Middlesex;' P.=Hyde Park; G.=Kensington Gardens. The names used are those of the 'London Catalogue.'

Ranunculus hederaceus, L. "Hyde Park, 1817. Goodger and Rozea's herbarium."—Fl. of M.

R. sceleratus, L. A plant this year in the gravel of the Serpentine Bridge. A few plants on the Serpentine margin near the bridge, 1868. "Trench between G. and the Park."—Fl. of M.

R. Ficaria, L. G., here and here. Turf south of the Palace, and in the north-east corner near Buck Hill Gate. Not observed in the Park.

R. acris, L. P., in the Magazine enclosure within rails. I have not seen it in the open turf. It must be of rare occurrence within our present limits. "Kensington Gardens."—Fl. of M.

R. repens, L. P., the strip. G., some fine plants of the smaller but typical form in the depression across the Ring Road east of the Magazine, towards the Humane Society's Receiving House.

R. bulbosus, L. P. and G., here and there in both. A few plants in the "strip" north of the Magazine.

Chelidonium majus, L. G., casual in flower-beds near Queen's Gate.

Nasturtium officinale, R. Br. "In Hyde Park, 1817, Herb. Goodger and Rozea."—Fl. of M.

N. sylvestre, R. Br. G., "inside of Kensington Garden railings, south-east corner."—Fl. of M.

Sisymbrium officinale, Scop. P., a few plants in the strip near the trench; more common in the enclosed places.

Erysimum cheiranthoides, L. P., has maintained itself as a weed for several years in the flower-beds west of the Marble Arch.

Sinapis arvensis, L. G., a weed from the south side of the Gardens; gathered by the Rev. W. W. Newbould.

Thlaspi arvense, L. Casual in some enclosed newly sown grass west of the Albert Memorial.

Camelina sativa, Cr. "Came up in Kensington Gardens with grass sown for turf, 1834; Mag. Nat. Hist. viii. 389."—Fl. of M.

Capsella Bursa-pastoris, De Cand. P. & G., everywhere; a large component of the open turf.

Coronopus Ruellii, Gært. G., abundant in the grass west of the fountains. P., here and there not uncommon.

C. didyma, Sm. G., all along in the gravel of the path on the bridge over the Serpentine; continuous for 100 yards. P., a plant under a clump of trees about 200 yards west of the Magazine.

Reseda Luteola, L. "Wall south side of Hyde Park, 1815. Goodger and Rozea's Herb."—Fl. of M.

Lychnis Githago, Lam. G., casual as a weed on the south side of the Gardens; gathered by the Rev. W. W. Newbould.

Sagina procumbens, L. G., near the well, under the Scotch firs, in the path north of the palace. P., in the strip.

S. apetala, L. (vera). P., a single plant in the strip.

S. ciliata, Fries. P., west of the "Humane Society" towards the Magazine, near an old road which has become grassed over. It grows plentifully and is conspicuous enough. An excellent spot to study the species, as the examples are nicely grown and typical.

Arenaria serpyllifolia, L. P., in and near an old road now turfed over, west of the "Humane Society."

Stellaria media, With. P. and G., in the open turf wherever it gets a little bare; common and general.

S. graminea, L. P., in a flower-bed near the old Reservoir. "Kensington Gardens, 1845, Morris."—Fl. of M.

Cerastium glomeratum, Thuill. P., on some bare rubbish-made ground 200 yards north-east of the Magazine. This was a casual, and the ordinary form. In the old grassed road west of the "Humane Society." 5 or 6 plants, a dwarf apetalous state; *C. apetalum*, Dum.? "In Hyde Park, Merrett."—Fl. of M.

C. triviale, Link. G. and P., common in the open turf, and in every pathway edge. "Kensington Gardens."—Fl. of M.

Moenchia erecta, Sm. P., "Hyde Park, Dickson's H. S. In the dry part north of the Magazine, 1820, Bennett."—Fl. of M. I believe this still may be re-found in Hyde Park, judging by the nature of the ground in a few likely places where plants apparently of similar situations to *Moenchia*, often associated with it, and quite as unlikely to endure smoke, still hold their ground. It must be sought early.

Spergularia rubra, Fenzl. P., in the strip, several patches; one of considerable size near the pathway north from the Magazine. Several plants at the west end of Rotten Row. "Kensington Gardens, 1866."—Fl. of M.

Spergula arvensis, L. P. and G., casual here and there, sown among Grass seeds in enclosed places.

Malva sylvestris, L. P., a plant in a flower-bed near Prince's Gate, probably casual here.

Hypericum humifusum, L. "Hyde Park, 1815. Goodger and Rozea's Herb."—Fl. of M.

Geranium molle, L. G. and P., here and there in the open turf, *e. g.*, in the strip, and plentiful near the old grassed road west of the "Humane Society." "Kensington Gardens."—Fl. of M.

G. pusillum, L. P., three plants near the old grassed road, say fifty yards west of the wall of the Deputy-Ranger's grounds.

G. dissectum, L. P., two plants in the turf just across the Ring Road, north-east of the Magazine; seems rare in our limits.

Erodium cicutarium, Sm. G., a single plant under the yews north of the Palace, 1868. This is probably a species once plentiful here, dying out rather than a casual. I could not find it this year.

Ulex europæus, L. P., several casual seedlings in a flower-bed near Prince's Gate.

Medicago lupulina, L. P., casual, in a flower-bed near Prince's Gate. Also a plant in a tree-fence east of the "Humane Society."

Melilotus arvensis, Wallr. P., a plant in enclosed new turf fifty yards east of Victoria Gate; casual.

Trifolium pratense, L. G., casual, near the Albert Memorial, in newly sown turf; I have never noticed it in the Park turf where *T. repens* is so abundant.

T. subterraneum, L. P., "Hyde Park, 1780, Smith. Herb. Linn. Soc. and E. B. 1048."—Fl. of M.

T. glomeratum, L. P., a single plant in the strip north of the Magazine. This interesting discovery is due to the Rev. W. W. Newbould, who first perceived this plant on a joint Park-searching expedition July 13th, 1871. I may here acknowledge my great indebtedness to that gentleman in the compilation of this list.

T. repens, L. G. and P., everywhere a common component of the open turf, and apparently very universally diffused over it.

T. fragiferum, L. "Hyde Park. Dickson's Hortus Siccus Britannicus. London, 1793–1802."—Fl. of M.

T. minus, Relhan. P., the strip and the old grassed road west of the "Humane Society," where it grows plentifully in the open turf; the grass is nearly always worth searching where this occurs plentifully, as most of our best park species grow associated with this or *T. filiforme*.

T. filiforme, L. P., in the strip, and plentiful near and upon the old grassed road west of the "Humane Society." G., in the hay-grass west of the Palace. "Hyde Park, 1815. Herb. Goodger and Rozea."—Fl. of M.

Lotus corniculatus, L. P., several plants in the grassy road length between the "Humane Society" and the Magazine across the Ring Road.

Vicia hirsuta, Koch. G., casual in a tree-fence near the fountains; also nearly under the Serpentine Bridge Arch. P., in a tree-fence north-east of the Magazine across the Ring Road.

V. Cracca, L. P., in a flower-bed near the old Reservoir, Rev. W. W. Newbould.

V. angustifolia, Roth. P., one plant east of the Magazine, in the turf, probably native; casual, in newly-sown grass enclosed near Prince's Gate. "Hyde Park, Dickson's Hortus Siccus Britannicus."—Fl. of M.

Ornithopus perpusillus, L. P., two nicely-podded plants in the strip; say 200 yards north of Magazine and another plant say fifty yards further on. "Hyde Park beyond the spring, 1790. E. B. 369, and Herb. Linn. Soc. Ibid. 1816. Herb. Goodger and Rozea."—Fl. of M.

Alchemilla arvensis, Scop. P., casual, in a tree-fence 300 yards north-east of the Magazine. "Hide Park. Johnson's ed. of Gerarde's Herbal. 1633."—Fl. of M.

Potentilla reptans, L. G. and P., common; often mixed with the open turf, as in the strip and old grassed road. "Hyde Park, 1817. Herb. Goodger and Rozea."—Fl. of M.

P. Tormentilla, Schenk. G., a casual, in a flower bed near Prince's Gate; evidently brought with peat earth for some Rhododendrons, and associated with *Pteris* and seedlings of *Rubus*.

Rubus macrophyllus, Weihe, var. *umbrosus*, Arrh. G., several nice bushes in the hedge which bounds the Gardens on the west and runs north from the Palace. This is the *R. carpinifolius* of the Rev. A. Bloxam.

R. Kœhleri, Weihe, var. *pallidus*, Weihe. Five or six good plants in flower at intervals in the hedge which runs north from the Palace. It is interesting that the two Kensington Gardens' subspecies of *Rubus* should belong to two very different sections of the genus.

Epilobium montanum, L. G., plentiful for several years in a flower-bed exactly in the north-west angle of the Gardens.

E. obscurum, Schreb. G., in a flower-bed near the north-west angle of the Gardens. Rev. W. W. Newbould.

E. roseum, Schreb. G., A flower-bed weed in the south side of Kensington Gardens; a plant brought to me newly gathered by Mr. Newbould. "Hyde Park, opposite Bayswater Road. Irvine's 'Handbook of British Plants,' 1858."—Fl. of M.

Circæa lutetiana, L. G., in a flower-bed north-west angle of the Gardens. Rev. W. W. Newbould.

Myriophyllum spicatum, L. "Octagon pond and Serpentine; common." —Ibid. Fl. of M. [Note here that no *Callitriche* has as yet been observed. It would be difficult to find at this time of year any country piece of water equal in extent to the Serpentine without this genus being very obvious in it. Are we to infer that *Callitriche* stands smoke worse than *Potamogeton*, *Zannichellia*, and *Myriophyllum*, all of which the Serpentine yields?]

Montia fontana, L. P., "Frequent in Hide Park. Merrett."—Fl. of M.

Helosciadium nodiflorum, Koch. Noticed three years ago in the trench which runs north of the Magazine and bounds Hyde Park; not seen this year.—See also Fl. of M.

Bunium flexuosum, With. G., a common and widely-diffused plant in the Gardens, but not noticed in the Park. *Ibid.*—Fl. of M. [See the note there on the plant of the Gardens being recorded as *B. Bulbocastanum*, L.]

Sium latifolium, L. "Hyde Park. Cockfield." (1813).—Fl. of M.

Æthusa Cynapium, L. G., sown ground west of the Albert Memorial, etc.

Galium Aparine, L. P., twice in tree-fences 300 yards north-east of the Magazine; casuals.

G. verum, L. P., in the strip near the trench side; the patch is a yard or more in length. I recorded this in Fl. of M. as *G. saxatile* wrongly. The young states of each plant are more alike than a reader would suppose. G., in the hay-grass east of the Palace.

Tussilago Farfara, L. G., on an earth mound north-west side of the Serpentine Bridge near the "Humane Society" to the east, enclosed.

Erigeron canadensis, L. P., several plants just across the road near the Humane Society's Receiving-house, and a stray in several tree-fences near it.

Bellis perennis, L. G. and P., here and there; but very large spaces of the open turf are without a daisy-root.

Bidens cernua, L. "Ditch between Hyde Park and Kensington Gardens."—Fl. of M.

Achillea Millefolium, L. G. and P., everywhere; perhaps the commonest composite after *Taraxacum* in the open turf and path edges.

Anthemis nobilis, L. G., a patch of some size in the closely-mown lawn turf round some flower-beds on the south side of Kensington Palace. Probably this turf has been carried in from a distance.

Chrysanthemum inodorum, L. G. and P., generally appears on the hard bare spots in each and is not unfrequent.

C. Chamomilla, E. Mey. P., a stray plant or two, about 250 yards north-east of the Magazine.

C. Leucanthemum, L. G. and P., but I have only seen it thrice in real Park turf in the strip north of the Magazine, but it is common in newly-sown enclosed places, *e.g.* between Victoria and Cumberland Gate. "Hyde Park in the turf, 1868."—Fl. of M.

Artemisia vulgaris, L. P., casual, in a tree-fence 300 yards north-east of the Magazine.

Senecio vulgaris, L. G. and P., not common.

Carduus lanceolatus, L. P. and G., here and there, not common; *e.g.* in the trench.

C. arvensis, L. G. and P., *e.g.* in the strip, plentiful on the trench sides.

Lapsana communis, L. G., in the hedge running north of the Palace plentiful, and elsewhere.

Hypochæris radicata, L. P., the strip in the turf; also in the road edges near Cumberland Gate. "Hyde Park, Newbould."—Fl. of M.

Leontodon hispidus, L. P., one plant in the turf about halfway between the Magazine and the Ranger's House.

L. autumnalis, L. P., not uncommon, at the south end of the bridge over the Serpentine, etc.

Tragopogon pratensis, L. P., casual, introduced with grass seeds near Alexandra Gate. Likely enough to be "minor," but I could not settle the question from this individual plant.

Taraxacum officinale, Wigg. G. and P., a common component of the open turf, though it seldom gets the chance of flowering.—Var. *erythrospermum*, Andrz. P., in the strip associated with *Lepigonum rubrum* and *Veronica arvensis*, L. In the same company, near the old grassed road west of the "Humane Society," and again on some hard, higher ground east of it.

Sonchus oleraceus, L. P., in the pathway edge near Victoria Gate; doubtless elsewhere.

S. asper, Hoffm. P., in the railed enclosure of the Magazine; again in a tree-fence 200 yards north-east across the Ring Road.

S. arvensis, L. G., a root or two on an earth-heap to the north-west of the Serpentine Bridge; casual.

Crepis virens, L. A plant in the turf south of the site of the old Gravel Pit; rare in open grass, but several plants in the Magazine enclosure.

Campanula rotundifolia, L. P., five or six plants will reward a careful search in the strip north of the Magazine. These are most interesting survivors of the original Park herbage. G., turf near the Greenhouse.

Cuscuta europæa. "Hyde Park, in the sunk ditch under the wall of Kensington Gardens on nettles and thistles, 1820 and 1821; Bennett (v. s.)."—Fl. of M. The thistles and nettles still remain here, but where is the great Dodder?

Convolvulus sepium, L. A weed in a flower-bed in the south of the Gardens; gathered by the Rev. W. W. Newbould. P., near the Reservoir, in flower-beds.

C. arvensis, L. P., in a flower-bed near Buck Hill Gate; again near the Reservoir.

Solanum nigrum, L. G., a weed in flower-beds near Lancaster Gate. P., several plants 200 yards north-east of the Magazine in a rubbish-heap place.

S. Dulcamara, L. G., in the hedge which bounds the gardens north of the Palace; plentiful at intervals for 200 yards in among the planted hedge *Cratægus*.

Veronica arvensis, L. P., not uncommon in the turf of the strip north of the Magazine; also fairly common about the old grassed road west of the Humane Society's Receiving-house.

V. agrestis, L. "Kensington Gardens, Warren, v. s."—Fl. of M. I find this record, which must apply to 1869 or earlier. I have not seen the plant since and cannot recall its finding specially. Mr. Newbould has seen it thrice this year.

V. polita, Fries. P., a weed near Buck Hill Gate, in a bed.

V. Buxbaumii, Ten. P., casual, in a tree-fence 300 yards north-east of the Magazine.

Scutellaria galericulata, L. "Kensington Gardens. Herb. Goodger and Rozea, 1817."—Fl. of M.

Nepeta Glechoma, Benth. P., railed round at the Magazine, south side.

Prunella vulgaris, L. P., native; five or six plants in the turf just west of the Magazine and across the Ring Road.

Myosotis arvensis, Hoffm. P., a weed near Buck Hill Gate.

M. palustris, With. G., casual, in a flower-bed in the south of the Gardens; gathered by the Rev. W. W. Newbould.

Lamium purpureum, L. G., a weed in a flower-bed near Lancaster Gate. "Kensington Gardens."—Fl. of M.

Stachys sylvatica, L. Say a dozen plants nearly in the north-west angle of the Gardens, in a flower-bed near *Epilobium montanum*, L.

Anagallis arvensis, L. G., casual in newly-sown grass near Prince's Gate. P., also in a tree-fence north-east of the Magazine across the Ring Road.

Plantago Coronopus, L. P., a few plants near an old grassed roadway west of the Ranger's House. "Hyde Park. Milne and Gordon's 'Indigenous Botany,' etc., 1793."—Fl. of M.

P. lanceolata, L. G. and P., is certainly much less common in the open turf than *P. major*, but I have seen it there frequently also.

P. major, L. G. and P., everywhere; a common plant of the open turf.

Chenopodium album, L. P., casual, in newly-sown land between Rotten Row and the Serpentine; again in a tree-fence near the old gravel-pit's site.

C. polyspermum, L. P., in a bed near Alexandra Gate. Rev. W. W. Newbould.

C. murale, L. P., a weed in a flower-bed just before entering the gardens at their north-east angle, 1868; several plants there this year. See Fl. of M.

Atriplex patula, var. *angustifolia*, Sm. P., in flower-beds near Prince's Gate and elsewhere.

Polygonum amphibium, L. G., several beds in the Serpentine between the bridge and the fountains. "Abundant in the Serpentine, 1868."—Fl. of M. *β. terrestre*, some plants on land adjoining the former beds,

P. lapathifolium, L. P., casual, in a tree-fence north-east of the Magazine, say 300 yards, near where the gravel pit used to be.

P. Persicaria, L. P., casual, a plant enclosed near the Humane Society's Receiving-house. G., in some quantity in a flower-bed near the north-west angle of the Gardens.

P. Hydropiper, L. G., casual, in a tree-fence west of the fountains and near them.

P. aviculare, L. G. and P., everywhere in path-edges and bare places.

P. Convolvulus, L. P., casual, in a tree-fence 300 yards north-east of the Magazine.

Rumex viridis, Sibth. P., a good many plants at the very bottom of the trench running north of the Magazine. G., plentiful in a flower-bed near the north-west angle of the Gardens.

R. obtusifolius, Auct. G. and P., here and there, near the trench, etc. Not uncommon. Some fine plants at the margin of the north end of the Serpentine among the shrub-beds.

R. crispus, L. P., casual, and enclosed near Victoria Gate. Elsewhere in similar situations. I gathered one very stunted specimen in the turf of the "strip" north of the Magazine.

R. Acetosa, L. P., local. A tuft under some trees due west of the Magazine, and several more about the old grassed road west of the "Humane Society." Much less common than the next in our limits.

R. Acetosella, L. G. and P., plentiful in the turf of the strip running north of the Magazine. Much commoner than the last.

Euphorbia Peplus, L. G., a weed from a flower-bed in the south of the Gardens. Gathered by the Rev. W. W. Newbould.

E. Helioscopia, L. A weed in a bed near Buck Hill Gate.

Mercurialis annua, L. P., in a flower-bed at the east end of the Serpentine one plant.

Urtica dioica, L. G., in the Magazine enclosure. P., a stray plant or two in bare places. Not common.

U. urens, L. G., a weed near the Albert Memorial, etc. P., twenty or thirty plants under a clump of trees north-west of the Magazine, near where the gravel pit used to be.

Elodea canadensis, Rich. Octagon pond and Serpentine, common. "Serpentine, Kensington Gardens, where it flowers profusely."—Fl. of M.

Juncus bufonius, L. P., in a flower-bed near Prince's Gate, probably casual. Several plants there. It grew with other casuals, and I have no *Juncus* out of a flower-bed to record yet in this list.

Luzula campestris, L. "Hyde Park, Merrett, 1666."—Fl. of M.

Butomus umbellatus, L. "Bayswater canal in Kensington Gardens. Herb. Goodger and Rozea, 1817."—Fl. of M.

Lemna polyrrhiza, L. "Serpentine, Herb. Devon Institution, Exeter." —Fl. of M.

Potamogeton perfoliatus, L. "Ornamental basins at head of Serpentine."—Fl. of M.

P. crispus, L. Octagon pond abundant, and Serpentine, but less so in the latter. "Ornamental basins at head of Serpentine."—Fl. of M.

P. obtusifolius, Koch. "In the great circular pond opposite Kensington Palace, Herb. Hardwicke, 1840–1855."—Fl. of M.

P. pusillus, L. Many tufts of this may be found by taking a boat anywhere north of the Serpentine Bridge, and from thence to the fountains.

P. pectinatus, L. (Syme, E. B.). Gathered several times *in situ* from a boat between the Serpentine Bridge and the fountains, but not so abundant this year as either *P. pusillus* or *Zannichellia* there. This is curious, as I find no previous note for either of these, while *P. pectinatus* is well known as a Serpentine plant from early times. I see by Fl. of M. that I also got it from the octagon pond in some year anterior to 1869. The following notes are from the 'Flora of Middlesex':—"Serpentine River, Hyde Park, Hudson's 'Flora Anglica,' 1762. The *P. zosteraceus* (Bab. Man. eds. 1, 2) of the Serpentine, Hyde Park, Dr. J. A. Power, was a form of *pectinatus*. The locality was omitted in subsequent editions, when the name was changed to *P. flabellatus*, nor is it (the locality) given in a list by Mr. Babington of localities for the latter plant in Phyt. iv. 1160." I only see in my specimens ordinary *pectinatus*.

Zannichellia palustris, L. Octagon pond and Serpentine common. Can be easily gathered floating on the margin of either. This plant fruits nicely here, and is *eu-palustris* and not *Z. pedicillata*, Fries. If the botanist takes a boat, he will find great quantities growing between the bridge and fountains nearly all the way.

Carex muricata, L. P., in the strip north of the Magazine one plant, and a fair quantity of the plant just across the Ring Road due west of the Magazine. "Hyde Park, Mr. Groult. Notes by Sir E. Smith in B. M. on the original drawings for E. B., 1790–1814, and Kew Herb."—Fl. of M.

C. ovalis, Good. "Kensington Gardens, E. B."—Fl. of M.

C. flava, L. "Hyde Park, 1817, Herb. Goodger and Rozea."—Fl. of M.

C. hirta, L. P., in the strip north of the Magazine, and again between it and the "Humane Society, across the road a good many plants."

Phalaris arundinacea, L. "Serpentine, 1813, Herb. Devonian Institution, Exeter."—Fl. of M.

Anthoxanthum odoratum, L. G., casual, in some sown ground opposite the Albert Hall. I have not seen it in the genuine Park turf. Seems a grass impatient of smoke.

Phleum pratense, L. G. and P., plentiful in much of the open turf of the Park.

Alopecurus pratensis, L. G. and P., a component of the genuine Park turf; common.

A. agrestis, L. G., a plant close to the railings just before you come to the bridge over the Serpentine, going south. Another gathered for me in the south of the Gardens by the Rev. Mr. Newbould.

Agrostis vulgaris, With. G. and P., abundant over most of the Park turf. "Kensington Gardens."—Fl. of M.

A. alba, L. P., here and there in the turf between the Humane Society's Receiving-house up towards near the Magazine.

Aira flexuosa, L. Casual, among newly-sown grass between the south side of the Serpentine and Rotten Row.

A. cæspitosa, L. In an over-grown flower-bed on the north side of the palace; casual. Also on a heap of peat-earth near *Molinia*.

A. caryophyllea, L. "Hyde Park. Dickson, Hortus Siccus Britannicus, London, 1792–1802."—Fl. of M.

A. præcox, L. "Hyde Park, 1816. Herb. Devonian Institution, Exeter."—Fl. of M.

Apera Spica-venti, Beauv. P., casual, but plentiful in a newly-sown piece of turf due south of the Serpentine, and between it and Rotten Row.

Avena flavescens, L. P., in the strip, and again in some plenty in the very centre of the Park; abundant about the old grassed road and thence towards the gravel-pits' site; certainly a native grass of the turf, and thinly spread at intervals over the whole western herbage of the Park, even reaching the statue of Achilles. G., plentiful in the hay-grass east of the Palace, and again in the patch where the yews grow north of it. "Hyde Park, 1817. Herb. Goodger and Rozea," and several later records.—Fl. of M.

Arrhenatherum avenaceum, Beauv. P., a single plant in some meadow-looking grass 200 yards east of the Magazine, not far from the site of the old gravel pit.

Holcus lanatus, L. P., about three specimens gathered in the open turf in the north-west corner of Hyde Park, say 100 yards within the Ring Road, stunted and poorly grown. I had to search the Park many times before I found any.

H. mollis, L. G., casual; some fine plants with *Molinia* (q. v.).

Kœleria cristata, Pers. G., three or four tufts in flower this year close to the iron hurdles which bound the hay-grass on the east side of the Palace. It is curious that till 1866 this plant had no Middlesex record. This was to me a most unexpected addition to our list.

Molinia cærulea, Moench. G., casual, just north of the Palace near a greenhouse there is an enclosed heap of peaty soil for the garden-beds; upon this grow 20 or 30 fine plants of *Molinia*. There are also here *Pteris*, *Aira flexuosa*, *Tormentilla officinalis*, and other nice plants.

Poa annua, L. P. and G., the main ingredient of the herbage in both. The most smoke-enduring of grasses.

P. trivialis, L. P. and G., rather less common than *P. pratensis*, but native here also.

P. pratensis, L. G. and P., fairly common; certainly a native Park grass.

P. nemoralis, L. P., casual, here and there in a newly-sown and enclosed piece of turf between the Serpentine and Rotten Row, and due south of the former. "Kensington Gardens. Morris, v. s."—Fl. of M.

Glyceria aquatica, Sm. "Serpentine, 1813. Herb. Devonian Institution, Exeter."—Fl. of M.

Sclerochloa distans, Bab. P., casual, here and there in a newly-sown piece of turf due south of the Serpentine, and between it and Rotten Row.

Cynosurus cristatus, L. P., common in the open turf, crossing the Park from about opposite Albion Street southwards; also in the strip here and there, and across the road towards where the old gravel-pits used to be; also fairly diffused over the whole western Park side.

Dactylis glomerata, L. G. and P., a general ingredient of the open park turf.

Festuca sciuroides, Roth. P., a few tufts near the old grassed road, west of the "Humane Society," associated with *Plantago Coronopus*, L., and *Sagina ciliata*, Fries. "Kensington Gardens, Notes by Winch and New Bot. Guide, 103."—Fl. of M.

F. ovina, L. P., local or overlooked; a few plants in the strip between the Ring Road and Kensington Gardens trench. "Hyde Park, S. Gray, Herb. Devonian Institution, Exeter."—Fl. of M.

F. duriuscula, L. P., here and there, as in the strip and near the old grassed road; also in part of the open turf south of the old gravel-pit, etc. G., in the hay-grass east of Palace, common. "Kensington Gardens, Morris, 1850, v. s."—Fl. of M.

F. pratensis, Huds. P., between the Serpentine Bridge and Rotten Row, to the south-east, among bad and newly-sown turf; but I have not yet gathered this in the real open turf north of the Serpentine.

Bromus asper, L. G., above a dozen plants in an overgrown and long unweeded enclosure running north from the Palace and bounding the Gardens. This plant possesses all the characters of true *B. asper*, as distinguished from *B. serotinus* of Beneken. (See Journ. Bot. Vol. VIII. pp. 376–379.)

Serrafalcus mollis, Parl. P. and G., thinly but generally distributed in the open turf.

S. racemosus, Parl. P., casual, a single plant from some bare intervals in the turf, north-east of the Humane Society's Receiving-house.

Triticum repens, L. G. and P., here and there, on an earth-mound to the north of the Serpentine Bridge, etc.

Hordeum pratense, Huds. P., in the turf soon after you cross the road, 200 yards east of the Magazine, a tuft of some dozen good spikes.

H. murinum, L. G. and P., common, near the old grassy road, and abundant at the east end of the Serpentine, and in many path edges.

Lolium perenne, L. G. and P., next to *Poa annua* the chief factor in metropolitan herbage. See Fl. of M.

L. italicum, Braun. Casual, on an earth-heap north of the bridge and near it.

Equisetum arvense, L. P., casual, in a flower-bed near Prince's Gate.

Pteris aquilina, L. G., casual, near Prince's Gate in a flower-bed, introduced with peat-earth for Rhododendrons. "Hyde Park, about 1825, Pamplin."—Fl. of M.

Chara vulgaris, L. G., Octagon Pond, floating at the side amongst *Zannichellia*.

ON THE GENUS *FALLOPIA*, *Lour.*

By H. F. Hance, Ph.D.

In his 'Flora Cochinchinensis,' published at Lisbon in 1790, Loureiro described, under the name of *Fallopia nervosa*, a small tree which he referred to the Linnæan class and Order *Polyandria Monogynia*, with the following generic character:—"Calyx communis 12-phyllus, foliolis lanceolato-linearibus deciduis, continens 3 flosculos. Perianthium proprium nullum. Petala 5, ovata, subpatentia, calyce longiora. Nectarium foliolis 5, ovato-oblongis, parvulis, erectis, æqualibus. Staminum filamenta 50 circiter, filiformia, inæqualia, receptaculo inhærentia; antheræ subrotundæ. Germen subrotundum, superum; stylus crassus, subulatus, brevior staminibus; stigma simplex.. Bacca subrotunda, 1-locularis, 4-sperma. Semina subrotunda." He states it to inhabit waste places around Canton, and to be about eight feet high, with spreading branches, a tenacious hemp-like bark, ovate-lanceolate nerved subserrate smooth leaves, and white flowers in small terminal clusters.

Willdenow, who republished the work at Berlin three years later, added notes, with a view to correct the faulty determinations of Loureiro, and to reduce to their proper places as synonyms the many genera erroneously described by him as new. Since, however, he passes over *Fallopia* without any observation (i. 109), it is evident he could make nothing of it. Nor do subsequent botanists appear to have been more successful. I have searched for it in vain in De Candolle's 'Prodromus,' Bartling's 'Ordines,' Reichenbach's 'Conspectus' and 'Repertorium Herbarii,' Perleb's 'Clavis,' Endlicher's 'Genera' and 'Enchiridion,' Lindley's 'Natural System' and 'Vegetable Kingdom,' Meissner's 'Genera,' Dietrich's 'Synopsis Plantarum,' and Bentham and Hooker's 'Genera;' and I believe I am correct in saying that it has escaped the notice of all modern systematists, and so to say, slipped out of memory, being found neither as a received genus, a synonym, or even relegated to the limbo of "plantæ incertæ sedis," in any classification of the vegetable kingdom. The only reference to it with which I am acquainted is in the 'Chinese Chrestomathy' of the late Rev. Dr. Bridgman, published at Macao in 1841, where it is mentioned (p. 458) as growing wild on the islands near Macao; and it is added that the leaves are gathered by the Chinese as a substitute for tea.

I had long been greatly perplexed as to the shrub intended, and had for several years made from time to time fruitless efforts to discover it; and it is only quite recently that inquiries instituted by friends amongst the Canton herbalists have resulted in *Grewia Microcos*, L., being produced as the plant known by the Chinese name given by Loureiro. The characters assigned to *Fallopia*, through a misconception of the floral structure, by Loureiro, would have scarcely led one to suspect this to be the plant intended by him, but I have no doubt such is the case; and, when these characters are properly interpreted, they will be found to agree very well. Thus, the 'calyx communis' is the involucre, the number of whose component bracts is not mentioned by De Candolle, Roxburgh, Wight and Arnott or Miquel, but stated by Dietrich (Synops. Plant. iv. 238) to be 7, and by Bentham (Fl. Hongk. 42) to be 3 to 6, but which I find 8 to 10, and some of these not unfrequently laciniate or bifid; the 'flosculi' are the flowers, usually, as stated, ternate; the sepals, being coloured internally, were mistaken for petals; and the petals themselves, being less than half as long the sepals, and furnished with a foveola and gland, were described as 'nectarii foveola.' The fruit is in reality a drupe, composed of three confluent 1-celled 1-seeded pyrenæ; and it must have been imperfect examination which led Loureiro to describe it as 1-celled and 4-seeded. His account of the habit and specific characters of the plant is good. Its employment, recorded by Dr. Bridgman, by the poorer Chinese as a succedaneum for tea, seems dictated by a not unwise instinct, since Endlicher observes (Enchirid. Bot. 524): " *Grewia Microcos* cortice amaro-aromatico foliisque adstringentibus commendatur."

It follows from the above that *Arsis rugosa*, Lour., given by all writers as a synonym of *Grewia Microcos*, must be a different plant. To judge from the description, it is most likely a *Grewia* with exinvolucrate cymules, belonging to the section *Omphacarpus*.*

STATIONS OF, AND REMARKS ON, SOME PLYMOUTH PLANTS.

By T. R. Archer Briggs.

Ranunculus auricomus, L. This is local about Plymouth, and it seems that very few stations are recorded for it across the Tamar, in Cornwall. It occurs in the east of this county, on a bank (for about twenty yards) by the Torpoint and Liskeard turnpike, close to the entrance gate to Sconner House grounds; also, but very sparingly, by the same road, close to the seventh milestone from Torpoint.

Ranunculus hirsutus, Curt. Sometimes this appears only as a *casual* in waste spots by salt water and in arable land, but it is at least a *colonist* at St. John's, Cornwall, about four miles from Plymouth; and this summer (1871) I have found it so plentiful in a marsh at the head of Denabole "Lake," a tidal inlet from the Lynher, in the same county, that I should consider it a *native* if there were not a flour-mill near. In May, 1868, it occurred in damp spots in a lane near a farmhouse, a little to the north-west of Battisborough Cross, as well as in a field near. The lighter hue of both its foliage and flowers renders it distinguishable from *R. bulbosus* and *R. repens* at some distance.

Ranunculus arvensis, L. Very rare, and only as a *casual*. Four plants amongst wheat in the field opposite Antony Lodge, near Torpoint, Cornwall, May, 1871.

Helleborus viridis, L. This is generally seen growing in a patch or two in an orchard, or on a hedgebank by an old garden,—as at Trehan, in the parish of St. Stephen, Cornwall, where it occurs near plants of *Sedum Telephium*, a species very frequently met with close to old farmhouses or villages, but rarely found in wilder spots. At Pill, near

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* An examination of Loureiro's specimens of *Arsis* in the British Museum appears to sustain Dr. Hance's surmise as to the absence of an involucre. In other respects they are very similar to *G. Microcos*, L., slightly differing, however, in being more glabrous, having fewer-flowered panicles and smaller leaves. Unfortunately there is no specimen of *Fallopia* among Loureiro's plants.—H. T.

Saltash, in the same county, where it was first found by my friend Mr. Holmes, it is associated with *Ornithogalum umbellatum;* and in an orchard near Burrington House, Weston Peverell, Devon, it appears with *Narcissus biflorus* and a semi-double form of *N. poeticus.*

Berberis vulgaris, L. Mostly in hedgerows near gardens or by houses, but I consider this shrub indigenous in a few spots, as by a creek from St. John's "Lake," Cornwall, whence I have previously recorded it. It may be wild, also, in a hedgerow between Widey and Egg Buckland vicarage, where it extends for about two or three yards; there is also a single bush on the side of a hedgebank by a field above the valley to the west of Egg Buckland church.

Papaver dubium, L. The common representative of this about Plymouth seems to be *P. Lamottei*, Bor.; but, if Professor Babington's character of the "sap becoming dark yellow in the air" be decisive to mark *P. Lecoqii*, Lamotte, we have the latter also, as the sap of a Poppy now growing at Lipson has unquestionably this property, unlike that of all the other long-headed Poppies that I have tried. I cannot, however, find any other good mark of distinction between this Lipson plant and the others, although in it the contraction of the capsule above the torus seems rather greater than in those of them with which I have compared it.

Hypericum bæticum, Boiss.; *H. undulatum*, Schousb. This occurs rather plentifully in boggy spots surrounded by copse-wood at Warleigh, about five miles from Plymouth. Another Devonian station, where I first met with it last year, is the banks of a small tributary of the Yealm, on the southern border of Dartmoor; but there it grows only sparingly.

Geranium Robertianum, b. *purpureum*, Forst. (Lond. Cat. ed. 6). Growing abundantly from between stones against a bank at Holes Hole, in the parish of Beer Ferris, by the side of the (at that spot) tidal Tamar, June, 1871. At a distance this looks almost intermediate between typical *Robertianum* and *G. lucidum*, from its small flowers, vividly-coloured stems, and nearly glabrous condition.

Medicago denticulata, Willd. Not general even on the coast, but there I consider it indigenous. Plentiful in grassy spots about a cliff at Port Wrincle, Whitsand Bay, Cornwall, May, 1871; also on a bank on the Devon side of the Tamar at Holes Hole, growing with *Salvia verbenaca*, June, 1871.

Trigonella ornithopodioides, De Cand. This occurs in too many localities about Plymouth to be considered rare, though its maritime tendencies render it local. Noticed this year (1871) at the following unrecorded stations:—Crabtree, Devon; Port Wrincle and Trevollard, Cornwall,—at the last place associated with *Mœnchia erecta*, *Trifolium subterraneum*, and *Ornithopus perpusillus*, species that it often grows with.

Alchemilla vulgaris, L. By a stream in a pasture above the Erme valley, opposite Lukesland, near Ivybridge. This is rare. It occurs mostly in elevated pastures on the borders of Dartmoor, as in the case just named; occasionally, however, it is found in low damp situations, as in the Tavy valley and near Blaxton.

Pyrus torminalis, Ehrh. A splendid example of this, a tree at a rough calculation between 30 and 40 ft. high, with a base clear of branches for about 6 feet from the ground, and a few inches from its surface 4 ft. in circumference, grows in Warleigh Wood, near the heronry;

in another part of this wood are six more small trees or bushes, the largest of them from 15 to 20 ft. high; and in a third spot are three or four from 5 to 7 ft. high.

Scleranthus annuus, L. Quite a rare species around Plymouth. In a waste spot by the junction of two lanes, lying between the Saltash and Callington Road and the Moditon Mill and Pillaton Road, May, 1866, and again seen in 1870; on Trevollard Green, May, 1871. These are the only stations at which I have ever seen it in East Cornwall; and elsewhere, about Plymouth, I have found it in only three or four places.

Tragopogon pratensis, L. On taking the relative length of the florets and phyllaries as a means for distinguishing the forms of this from one another, I find that the Plymouth examples belong mostly to β. *minor*, Fries, Syme; but the form α. *genuinus*, Syme, with florets about equal in length to the phyllaries, occurs on a bank by the footpath between Plymouth and Laira Bridge. It differs, however, from Babington's description in having brown, not yellow, anthers. I have never met with the form γ. *grandiflorus*, Syme.

Inula Helenium, L. Three small patches on a bank close to the lawn of Trevollard House, Cornwall; very near are bushes of *Berberis vulgaris*, extending for eight or nine yards. Both this shrub and the *Inula* were doubtless originally introduced there.

Leonurus Cardiaca, L. Three plants on Trevollard Green, Cornwall, May, 1871.

Chenopodium Bonus-Henricus, L. A few patches of this denizen grow by a wall near the church at St. Stephen's-by-Saltash, Cornwall. The locality produces *Malva rotundifolia*, a plant rather rare about Plymouth, and confined, in a remarkable way, to situations about old farmhouses or villages.

Avena pubescens, L. Local and rare. In shallow soil on limestone rock, in waste spots between Hay Farm and Elburton, associated with *Briza media*, L.

Lastrea spinulosa, Presl. In most places about some of the small tributaries of the Plym, between Long Bridge and Bickleigh; in boggy spots in Warleigh Wood, sparingly.

Ophioglossum vulgatum, L. Many dozens of specimens in a damp spot in a small wood in the parish of Egg Buckland, April, 1871. Tolerably plentiful in peaty depressions in a pasture by Crownhill Down, June, 1871. In the same enclosure I noticed about a dozen specimens of *Botrychium Lunaria*, Sw.,—a species almost certain to occur with the *Ophioglossum*. Both seem to grow more in old pastures that have had their surface disturbed at some distant date, than on the unenclosed and unbroken commons.

The places mentioned above are in Devon, unless the contrary is stated.

SHORT NOTES AND QUERIES.

Sisyrinchium Bermudiana, *L.*—There is a rumour (see 'Gardeners' Chronicle,' 1871, pp. 901 and 937) that this Irish native (see Journ. of Bot. VIII. p. 253) has been recently collected in a wild state on the coast of Hampshire, near Christchurch. "The plant grows in one part of a wood, within a radius of ten or fifteen yards, where it is pretty abundant. It grows amongst low, thick oak underwood, and long rank grass, the place being a moist one, and near a small running stream which comes from the direction of the New Forest. There is a small cottage and garden near the edge of the wood, about 100 yards from the place where the *Sisyrinchium* is found to the northward, the prevailing wind being W.S.W." I have not been successful in obtaining any further information than that a specimen of the plant, alleged to have been collected in the locality, was sent to the editor of the 'Chronicle.' If it prove a native in Hants, it will be a very interesting addition to the flora of a remarkable district of England, which is rich in rarities, and contains the only British locality for another Irish species, the *Simethis bicolor*, Kunth. By the way, botanists rarely write the name of this species correctly. Its old name (Dillenius's) was *Bermudiana graminea flore minore cæruleo*, and Linnæus, as was frequently his practice, adopted the previous appellation as a specific name (Sp. Plant. 1353). A parallel case is *Lythrum Hyssopifolia*, L, ; here, as in the *Sisyrinchium*, the trivial name is not an adjective term, but a substantive, and the original name of the plant.—HENRY TRIMEN.

BRITISH PLANTS UNDER CULTURE.—Few persons have any conception of the ornamental capabilities of many of our indigenous plants. It is remarkable, however, how much can be done with them, if they are grown with a little care. At the Horticultural Society, July 19th, Mr. Parker took the first prize for a group of hardy perennials grown in 12-inch pots. Several of the plants were natives, such as *Armeria plantaginea*, *Centranthus ruber*, var. *albus*, and *Potentilla reptans*, flore pleno. Others, such as *Veronica maritima* and *Betonica hirsuta*, could probably be equalled in effectiveness by native species allied to them, such as *Veronica spicata* and *Betonica officinalis*. The plants were about 18 inches through, and under 2 feet in height, clothed with foliage to the pots, and covered with flowers. Many exotics look far less attractive than these wild plants. It was curious to notice how cultivation had restrained and toned down coarseness of growth, and given that air of unweed-like refinement characteristic of all garden-grown plants.—W. THISELTON DYER. [At the last show of the Royal Botanic Society, I was equally struck with the elegant and beautiful appearance of a tall-growing, white-flowered form of *Campanula rotundifolia* grown in pots and in profuse blossom.—HENRY TRIMEN.]

SURREY CASUALS.—In April this year I found in a field of Clover and Grass, about a mile south of Gomshall, Surrey (between Guildford and Dorking), *Veronica triphyllos*, *Camelina sativa*, and *Alyssum calycinum*. This *Veronica* has not, I think, been noticed before in Surrey; only one specimen was found. All were, doubtless, introduced.—F. EVERSHED.

GALIUM TRICORNE, *L.*—I enclose a specimen of this species, which I gathered on the bank of the new road through the brickfields, behind St. Augustine's Church, Stoke Newington, at the beginning of this month, July, 1871.—FREDERICK J. HANBURY. [This cannot be regarded as other than a casual in this locality, although more than one plant was found; it has not, however, been previously observed, or at all events recorded, in Middlesex.—H. T.]

SUBULARIA AQUATICA, *L.*, IN MERIONETHSHIRE.—It is stated in Syme's 'English Botany,' vol. i. p. 201, that "Carnarvonshire and Anglesea seem to be the only English localities" for this plant. It may, therefore, be interesting to record its existence in the county of Merioneth. I gathered it on July 10th, at Cwm Bychan, in the mountain range north-east of Barmouth, where it grows at the lower end of the lake, in company with *Lobelia Dortmanna.* There can be no reason why it should not be found in other of the numerous lakes which stud the county of Merioneth.—WM. MATHEWS.

MONSTROSITY OF VIOLA SYLVATICA.—The Rev. H. N. Ellacombe, rector of Bitton, near Bristol, one of our most successful and experienced cultivators of hardy flowering plants, has just shown me a monstrosity of the common Dog-violet, produced in his garden under singular circumstances. The plant of the Violet came up accidentally amongst specimens of the cristate form of *Lastrea Filix-mas*, and many of its leaves had become abnormally dilated, and at the same time plaited and crisped, after the fashion of the pinnæ of the Fern. It produced flowers and fruit, and has been reproduced from seed. Is it possible that the peculiarity has been conveyed from the Fern to the Violet? The two grew in close contact. A specimen of the Violet has been dried for the Kew herbarium. —J. G. BAKER.

CYBELE (*vide* p. 78).—With regard to the penultimate syllable of the word Cybele, it may be remarked that its quantity as a Greek word is indisputably short. The Virgilian difficulty may be got over by reading the form used occasionally by Herodotus—Cybēbe; or as is quite allowable in poetry (witness the constant practice of Homer), doubling the *l*—Cybelle.—W. THISELTON DYER.

RANUNCULUS LENORMANDI, *Schultz*, IN WORCESTERSHIRE.—On the 5th of April last a botanical party, consisting of Mr. Edwin Lees, the Rev. J. H. Thompson, Dr. Fraser and myself, observed this plant in two localities in the neighbourhood of Stourbridge, viz. at Pedmore Common, in the parish of Pedmore, and near the Birches, in the parish of Hagley. I have since gathered it in fine fruit at the latter place. It has not, so far as I am aware, been previously detected in the county of Worcester.—W. MATHEWS.

NEW BRITISH ÆCIDIUM.—At the last monthly meeting of the Winchester and Hampshire Scientific and Literary Society, June 12th, Mr. R. S. Hill, of Basingstoke, exhibited numerous specimens of *Æcidium Statices*, Desm., found by him on leaves of *Statice Limonium* between Hythe and Calshot, near Southampton. This species of Cluster-cup is new to Britain, and is stated to be uncommon on the Continent.—F. J. WARNER.

MONSTROUS STATE OF CARDAMINE AMARA.—Early in June this year Mr. James Britten and I found in a wood at Morley, Cheshire, a great number of very remarkable flowers of *Cardamine amara*, in which the petals were persistent, and were of a rich purple colour. These flowers were unexpanded, and of a solid, globular form; and we, at first, supposed they were buds that would eventually open out into double flowers, such as are not unfrequently met with in *Cardamine pratensis*. On examination, however, this abnormal development was found to be due to the attack of minute insects, small yellow grubs, very similar to the larvæ of the Wheat Midge (*Cecidomya Tritici*), that are so often found amongst the chaff scales of wheat. Each flower contained a dozen or more of the parasites. The flowers themselves had become strangely altered. The sepals were thickened and otherwise somewhat enlarged, green and persistent; the petals persistent, unaltered in texture but purple in colour; the filaments much swollen, but the anthers quite unaltered; and the pistil considerably enlarged. The peculiar thickening of the parts of the flower was, no doubt, due to the puncture of the parent insect when she deposited her eggs, as is the case in all kinds of galls, rather than to the effect of the larvæ feeding on the juices of the flower. In fact, the flower was partially converted into a gall,—a nidus for the young brood of insects; but it is strange that an injury of this kind should have caused such a very marked change in the colour of the petals.—ROBERT HOLLAND.

STELLARIA UMBROSA, "*Opitz*."—I found this well-marked and striking form of *Stellaria media* in June last, growing abundantly in and near Morley Wood, near Mobberley, Cheshire, as well as in one or two other places in the neighbourhood. It is stated in Eng. Bot. ed. 3. ii. 95, to be of rare occurrence, and to be "most probably a sub-species," in which opinion I concur. Besides the characters there given, the size of the flowers—about midway between those of typical *S. media* and *S. nemorum* —would at once attract the attention even of a casual observer.—JAMES BRITTEN.

DRACOCEPHALUM THYMIFLORUM, *L.*—I am not aware that this plant has been previously recorded as an introduction; but have lately received a specimen gathered in a clover-field near High Wycombe, Bucks. I am informed that there were several large plants of it in this locality; and from the same field I have since received *Farsetia incana* and an *Anthemis*, probably *A. tinctoria*, but the specimens were too young for positive determination. The *Dracocephalum* is a north and east European species. —JAMES BRITTEN.

ECONOMICAL USE OF SCIRPUS LACUSTRIS AND OF S. MARITIMUS. —It may be worth notice that the soft culms of *S. lacustris* are largely used in the manufacture of casks for the purpose of caulking the spaces between the staves and between the boards of the heads of the barrels. Another *Scirpus*, *S. maritimus*, may be mentioned as supplying from the tubers of its rhizome a part of the food during winter of the grey-leg wild goose, *Anser ferus*. My friend Mr. Basil Brooke found in the crops of some of these wild geese, which he shot during the past season near the Murragh of Wicklow, a quantity of the tubers of the *Scirpus*, which abounds in this locality. Withering tells us that the roots of *S. maritimus* dried and ground to powder have been used instead of flour in times of scarcity.—A. G. MORE.

Acorus Calamus (*vide* p. 163).—In his account of the history of *Acorus Calamus*, M. Devos has only imperfectly acknowledged how much he was indebted for information to the researches of the late F. Kirschleger, who, in his 'Flore d'Alsace' (1857), not only pronounces decidedly against its nativity in the Rhine Valley, but also applies a large amount of information collected from the older writers, upon which his opinion was founded. As the merit of tracing the history of the plant in western Europe clearly belongs to Kirschleger, and as his book is very little known in England, it seems worth while translating the following passage from the 'Flore d'Alsace,' ii. p. 211:—"Notwithstanding this wide distribution in the Rhine countries, the Acorus is not spontaneous there. In the sixteenth century this plant did not exist in middle and western Europe, 'Omnino hoc Acoro caremus,' says V. Cordus. Tragus was not acquainted with it. Camerarius only speaks of it as an exotic drug; he says, "Nascitur in Ponto, Colchide et Galatia." Clusius, in 1574, had received living plants of *Calamus aromaticus* from Constantinople; he was then cultivating it in the basins of the Garden of Vienna, where it was fast increasing, and whence it was being distributed to various European gardens. Similarly, J. Bauhin tells us that in 1590 he was cultivating the Acorus in the garden of the Elector at Montbéliard, having brought it from the gardens at Stuttgardt, to which it had been introduced from the garden of the Margrave of Baden at Pforzeim; that, at Strasbourg, Melchior was cultivating it in 1591 in his garden, as was also Robin in the Jardin du Roy at Paris. J. Bauhin describes the mode of cultivation in damp sand near the reservoirs and trenches. It appears that Sebitz introduced the Acorus at Strasbourg, and J. Bauhin at Montbéliard and at Belfort. From the time of Lindern and of Mappus (1710–1750) it was very abundant in the neighbourhood of Strasbourg, to such an extent that Mappus was able to write 'Acorus, regionum septentrionalium incola, in Galliâ non reperitur, quo tamen nostræ Alsatiæ, isti regioni licet vicinæ, abunde prospexit natura." Thus, according to Mappus, it is Nature, and not the hand of Man, which has endowed our countries with the *Calamus aromaticus*. Even Haller (in his 'Enumeratio' and 'Historia') does not seem to question that the Acorus was indigenous; and even in modern times few florists, such as Dierbach (Flor. Heidelb.) and Schübler (Flor. Würtemb.), are satisfied of its exotic origin. By Linnæus (Flor. Suecica) it is described as growing 'copiose in fossis Scaniæ,' and by Ledebour in the northern provinces of Russia."—A. G. More.

Reports.

OFFICIAL REPORT FOR 1870 OF THE BOTANICAL DEPARTMENT OF THE BRITISH MUSEUM.

By William Carruthers, F.R.S.

The principal business done in the Department during the year 1870 has consisted in the completion of the rearrangement in the General Herbarium of the families *Gramineæ* and *Cyperaceæ*, in the arrangement of the *Cycadeæ*, *Piperaceæ* and *Lichenes*. In the critical revision and rearrangement of the European species of the families *Ranunculaceæ*, *Berberideæ*, *Nymphæaceæ*, *Papaveraceæ*, *Fumariaceæ*, *Polygoneæ*, *Gramineæ* and *Cyperaceæ*. In the naming, arranging, and laying into the General Herbarium of the extensive collections of Oriental plants made by Professor Haussknecht; of a collection of plants formed by Mr. Lownes in Palestine; of a portion of the collections made in Abyssinia by Dr. Schimper; of the collection of plants from Formosa, made by Mr. Oldham; of a series of plants from Madeira, collected by Masson and others, from the Herbarium of the late N. B. Ward; of a large collection from South Africa, formed by Harvey, Zeyher, and others, also from the Herbarium of the late N. B. Ward; and of an extensive series of ferns from the Islands of the Pacific Ocean, made by several collectors. In the rearrangement in the British Herbarium of the families *Salicineæ*, *Lemnaceæ*, *Juncaceæ*, *Gramineæ* and *Lichenes*. In the naming and rearrangement of the fossil *Cycadeæ* and *Lycopodiaceæ* in the first Exhibition Room. And in rearranging and relabelling the Gymnospermous fruits and stems in the second Exhibition Room.

The following are the principal additions made to the collections of the Department during the year 1870:—

I.—*To the Herbarium.*

General Herbarium.

Phanerogamia.

67 Species of plants from the Island of Banka in the Malay Archipelago; presented by Dr. Schiffer.
663 ,, ,, from Formosa, forming the Herbarium of the late Mr. Oldham.
20 ,, ,, from China; collected by Mr. W. G. Stronach; presented by D. Hanbury, Esq.
2625 ,, ,, from the countries bordering the Levant; collected by Professor Haussknecht.
444 ,, ,, from Martinique; collected by M. Hahn.
216 ,, ,, from various countries; collected by Dr. Seemann.
100 ,, ,, from old Calabar; collected by Mr. Robie.
20 ,, ,, from Seychelles; collected and presented by Professor E. Perceval Wright.
50 Species of critical Belgian plants, being fasc. 8 of Professor Van Heurck's 'Plantes rares ou critiques de Belgique.'
165 Species of plants from the Engadine; collected by J. L. Krättli.
200 ,, plants from Sicily, forming fasc. 9 and 10 of Todaro's 'Flora Sicula.'
100 ,, European plants, forming No. 12 of Wirtgen's 'Herbarium Rhenanum.'
375 ,, plants from the Tyrol; collected by Rupert Huter.
165 ,, *Gramineæ*, forming Baenitz's '*Gramineæ*.'
175 ,, *Juncaceæ*, forming Baenitz's '*Juncaceæ*.'
160 ,, plants from the Ionian Islands.
200 ,, European plants, forming cent. 11 and 12 of Schultz's 'Herbarium Normale.'

Cryptogamia.

150 Species of Cryptogamic plants, forming fasc. 5, 6 and 7 of the second issue of the 'Erbario Crittogamico Italiano.'
60 ,, *Hepaticæ*, forming decades 42–47 of Rabenhorst's 'Hepaticæ Europææ.'
100 ,, Mosses, from East Friesland; collected by Eiben.
75 ,, Lichens, forming Nos. 30–32 of Rabenhorst's 'Lichenes Europæi.'
50 ,, Lichens, being Müller's 'Cladoniaceen.'
100 ,, *Fungi*, forming No. 14 of Rabenhorst's 'Fungi Europæi.'
586 ,, ,, from the South of France; collected by Nylander and Roussel.
500 ,, ,, from North and South America.
351 ,, ,, from Cuba; collected by Charles Wright.
80 ,, *Algæ*, forming Nos. 213–220 of Rabenhorst's 'Algæ Europææ.'

British Herbarium.

Phanerogamia.

50 Species of British plants of critical value; presented by the Hon. J. L. Warren.
250 ,, critical English plants; collected by W. T. Thiselton-Dyer, Esq.
100 ,, British *Salices;* collected by the Rev. J. E. Leefe.

Cryptogamia.

100 Species of British Lichens; collected by the Rev. J. M. Crombie.
1500 ,, British *Fungi;* forming, with the species from the South of France and North and South America, enumerated above, the Fungological Herbarium of the Rev. A. Bloxam.
100 ,, British *Fungi;* collected by M. C. Cooke.
72 Preparations of British *Algæ*, exhibiting their structure and fructification; prepared by Ch. Adcock.
47 Slides of British *Diatomaceæ*, from the Herbarium of the late Professor Arnott; presented by F. C. S. Roper, Esq.

II.—*To the Structural Series.*

Fruit Collection.

3 Fruits of *Sicana odorifera*, Naud.; presented by Señor Correa de Mello, through D. Hanbury, Esq.
13 Species of Fruits and Seeds; presented by W. T. Thiselton Dyer, Esq.
A collection of Palm and other Fruits, from Brazil.
A fine series of Coniferous Fruits, grown in the Pinetum of Dr. Hogg, and presented by him.
A collection of Tropical Seeds and Fruits, chiefly from Africa.

General Collection.

Fine stem of *Encephalartos cycadifolius*, Lehm., from Natal.
Stem of *Testudinaria elephantipes*, Lindl., from South Africa.
Spirally twisted stem of *Dipsacus*, and stems of *Cratægus* and *Buxus;* presented by W. T. Thiselton Dyer, Esq.

Stems of *Paliurus* and *Anagyris*, from Mentone; presented by M. Moggridge, Esq.

III.—*To the Fossil Series.*

82 Preparations of Palæozoic and Secondary Plants, prepared by Mr. Norman.

An important series of Devonian Plants, from Canada, illustrating the published Memoirs of Principal Dawson; presented by Principal Dawson, of Montreal.

A fine slab of a species of *Lepidodendron;* presented by J. Waterhouse, Esq.

A specimen of *Sigillaria oculata,* Lindl.; presented by Henry Woolburn, Esq.

Specimens of Carboniferous Plants from Burntisland; collected and presented by George Grieve, Esq.

Caudex of a Fern from the Eocene beds of Herne Bay; presented by George Dowker, Esq.

Specimens of *Cyclopteris hibernicus*, Forbes, in fruit, and stem of *Sigillaria dichotoma*, Haught., from Kiltorcan, Ireland.

The number of visits paid during the year to the Herbarium for the purpose of scientific research was 1041.

Extracts and Abstracts.

THE TREES IN KEW GARDENS.

The following valuable notes are from Dr. Hooker's 'Report on the Progress and Condition of the Royal Gardens at Kew during the year 1870:'—"The effects of the long and severe summer's drought on the old trees have been disastrous; they have perished by hundreds—Elms, Ashes, Beeches, and Sycamores especially; many, no doubt, from having approached the limits of the age which such trees attain on so excessively poor a soil as that of Kew, but more, perhaps, through having been drawn up in thick plantations, and thus starved from the first. In pursuance of the Board's directions, active steps have been taken to clear large areas of dying and dead trees, to trench the ground and clear it of old roots, and plant closely a mixture of young trees of all sorts, which will be thinned out as they grow. This operation has enabled me to arrive at an approximate estimate of the ages of some of the more common trees in these grounds, and of the average duration which the several sorts have attained. The oldest trees in the grounds are undoubtedly Oaks, English Elms, and perhaps Hawthorns, of which some of the first and last may be relics of the aboriginal forests that covered this part of England; whilst the oldest of the Elms were undoubtedly all planted. No data have been obtained for ascertaining the age of the Oaks, but probably none exceed 300 years, and the majority date from the reign of George the Second. The only large ones that remain are several near the Brentford Gate, one near the upper end of the lake, and several near the Queen's Cottage grounds. The largest English Elms of which the rings have been counted are about 250 years old, but there are a few near the Palace gates which have probably attained 300 years. Of these the top of that nearest the gates was blown off this winter and the stump removed; but the butt was too far decayed for its rings to be counted. All the old Elms in the grounds and their outskirts are in rows, and were either planted along former walks, or came up in hedgerows, and were spared when the domain was enclosed and the hedges removed. Of Elms under 200 years old there were innumerable examples throughout the grounds; these were for the most part suckers from the roots of older Elms, which, coming up amongst the other and better trees, have done irreparable damage to them; the English Elm being of all plants the most impoverishing in light soils. Of the old Hawthorns, the last fine one perished during the summer's drought; they abounded at one time on the gravelly parts, and appeared to be of the same age as the old Richmond Park Hawthorns. Beech, Oak, and Maple are the only other trees that have sprung up spontaneously in the grounds, and all from originally planted trees. The oldest Beeches were planted in George II.'s reign, and are about 150 years old; but of these there are very few indeed. The largest of them is a magnificent tree near the Brentford gate, with a trunk 10½ feet in girth at five feet above the ground; its branches, which sweep and root in the ground, form a circle 116 paces in circumference. It is showing signs of decay. The majority of the Beeches, which formed eight-tenths of the arboreous vegetation of Kew, are part of an extensive and dense plantation, made about 1750, but which, having been wholly neglected during the succeeding hundred years, have impoverished one another to such an extent that the majority are already diseased and fungused. It is upon this Beech forest that the winter gales and last summer's drought have told most heavily; the majority, having no root-hold, could not resist the blasts, and the loss of one is immediately followed by that of its neighbours, both from the admission of the wind and from the sun's rays drying and heating the surface of the previously-shaded soil over their roots. Of other trees there are several good Limes, Evergreen Oaks, Spanish and Horse-Chestnuts, all from 150 to 200 years old; these trees have thriven well, and last long in the soil of Kew. The Ashes, Poplars, Acacias, and Willows average only from 100 to 150 years, and the Birches 60 to 80 years. The only good Coniferous trees of any age at Kew are Cedars of Lebanon and Larches: many of the former were planted about 1750, but of these not a dozen remain, the largest having attained a girth of eleven feet at five above the ground. The Spruces, Scotch Firs, Pinasters, and Weymouth Pines, have all been ruined by being crowded amongst forest trees. The Hemlock-Spruces, with which the path by the Richmond Road was ornamented twenty years ago, are every one dead; the last, which stood near the Pagoda, having succumbed to the drought of the past summer. Of Planes there never were many; a few fine orientals, planted in 1740–50, remain in the King of Hanover's grounds, one near the old Palace, and one near the Temple of the Sun. The above comprises all the trees of which there were any quantity in the grounds previous to their being made over to the public in 1845; since which time four-fifths have either died or have been removed to make way for buildings, avenues, paths, etc. Between 1840 and 1865 many efforts were made by my predecessor to keep up the sylvan scenery of the pleasure grounds, by planting Conifers amongst the old trees, in every available open space, especially Deodars, Cedars, Scotch, Douglas, Austrian, Corsican, and Weymouth Pines, *Pinus longifolia*, *Smithiana*, and Spruces of various sorts, besides forest trees innumerable; but, as permission could not be obtained, either to make sufficient clearances or to disturb the roots of the old trees by trenching the ground, these plantations have utterly failed. On the other hand he covered many acres of unoccupied land, by the river and elsewhere, and in the Queen's Cottage grounds, with plantations, which have all done well, and are now being thinned by transplanting young trees from them to fill the clearances which are being made elsewhere."

New Publications.

The Flowering Plants of Tunbridge Wells and Neighbourhood. By RICHARD DEAKIN, Esq., M.D. Tunbridge Wells and London. 1871. (Pp. 371.)

There is no doubt that this book will prove a useful one, but it is not as a local Flora that it chiefly claims our attention. Tunbridge Wells, indeed, scarcely needed a new list of its native Phanerogams, for the neighbourhood has been exceptionally favoured in this matter. T. F. Forster's excellent 'Flora Tonbridgensis' was printed in 1816, and after receiving additions from his son Thomas Forster, was again published in 1842, and a few years after appeared the 'Flora of Tunbridge Wells,' by Mr. E. Jenner. But little is added to existing knowledge of the botany of this part of Kent and Sussex in the work before us, though localities are given for all but the commoner species, and there are several hitherto unpublished stations for the rarer ones. Judged by the standard of recent attempts to investigate local botany in England, Dr. Deakin's book will not occupy a high place, even as an instalment towards a Flora of Kent; but, as hinted above, the interest of the work lies in another direction. Unlike most modern local Floras, descriptions of all the species are given in plain language, which, though short, are accurate and sufficient for diagnosis. But the most remarkable feature is the profuseness of illustration; there are probably not less than 800 woodcuts incorporated with the text, representing nearly every species described. Some readers doubtless remember the issue of Dr. Deakin's 'Florigraphia Britannica' in the years from 1837–1847, with coloured illustrations placed six on a plate separate from the text. The figures in this Tunbridge Wells Flora are the same cuts, but have greatly gained in appearance by being left uncoloured and being intercalated with the letterpress. The censure passed upon these figures (of the 'Florigraphia') by Pritzel is quite unnecessarily severe; though rough and possessing the inconvenience of not being drawn to any scale, the general aspect and habit of each species has been in nearly all cases very happily laid hold of, rarely leaving one in doubt for a moment as to the plant intended. The use of these already published figures has enabled the publishers to issue the Flora at a very low price—ten numbers at one shilling each—and so to bring it readily into the reach of many persons who cannot buy expensive treatises. There can be little doubt that it will spread to a considerable extent a knowledge of the indigenous plants of the district and simplify their study; and if of comparatively slight value to an advanced botanist, is just the book to recommend to any one in the neighbourhood commencing the investigation of wild plants. We regret to see a rather large number of misprints in the scientific names. We miss, too, altogether from the book *Carex montana*, one of the most interesting Tunbridge species,—an inexplicable omission.

H. T.

Proceedings of Societies.

DUBLIN.

Dublin Microscopical Club.—*March 23rd.*—Professor Thiselton Dyer showed a section of the fossil named by Principal Dawson *Prototaxites Logani*, and with it a section of *Taxus*, with a view to draw attention to the structural distinctions which seemed to indicate that the so-called *Prototaxites* was rather allied to some Algal form,—he would suggest some of the *Codieæ* (such as *Rhipozonium*, Kützing, Phyc. Gen. xlii. 3),—than to a Gymnosperm. There is no appearance of "disks," both longitudinal and vertical sections indicating that the mass is composed of a number of tubes running in a nearly parallel direction (occasionally bifurcating, according to Professor Archer), and apparently not septate or tapering, and with an intercellular medium, apparently formed of minor tubes. The principal longitudinal tubes appear on transverse section to have a wall concentrically stratified. Principal Dawson, in describing the Devonian rocks of Canada, speaks of the occurrence in the lower beds of the system of "trunks of drifted trees in the sandstones, at first sight resembling those of *Dadoxylon*. . . . They present," he says, "a regular tissue of long cylindrical fibres, marked on their sides with irregular spiral lines, and very distinct from those of modern Conifers, though their markings suggest the spiral lines on the cells of the genus, whence I have taken the name *Prototaxites* for these remarkable trunks. They have medullary rays and regular lines of growth, and attained sometimes a diameter of three feet. Unfortunately, we know nothing of their foliage or fruit, and can but suppose that they constitute a prototype of the Coniferous trees, probably very different from any known in the modern world." (Proc. Royal Inst. vol. vi. pp. 169, 170.) Mr. Carruthers, however, holds the view which he stated in a paper read to the British Association in 1870, that "the supposed Taxineous wood from the North American Devonians, to which Professor Dawson gave the name of *Prototaxites*, is a remarkable Alga of enormous size" ('Nature,' Oct. 6th, 1870). Portions of the supposed wood sent from Professor Dawson to Mr. Carruthers exhibit characters which belong to two very distinct plant-structures. One consists exclusively of regular parenchyma; the other, of which the specimens shown to the Club were examples, is that to which the description above quoted applies, at least as far as their microscopic characters. The appearance of "medullary rays" is probably produced by accidental cracks or fissures, no structure corresponding with them being shown by the microscope. The "lines of growth" would have their parallel in the pseudo-exogenous stems of the existing Alga *Lessonia*, of which Dr. Hooker remarks ('Flora

Antarctica,' ii. 458) that, in the Falkland Isles, the trunks washed up on the shore are often taken for pieces of drift-wood, and that, on one occasion, no persuasion could prevent the captain of a brig from employing his boat and boat's crew, during two biting cold days, in collecting this incombustible weed for fuel.

ROYAL IRISH ACADEMY.—*May 22nd.*—The Rev. J. Jellett, F.T.C.D., President, in the chair. The President communicated a paper on Saccharometry, giving the results of the determination of sugar in various specimens of Irish-grown sugar-beet by optical methods:—

	Amount of Sucrose in 100 grs. of root.		Amount of Sucrose in 100 grs. of root.
No. 1. White Magdeburg	12·05	No. 4. Vilmorin	12·59
2. Red-top White Silesian	9·56	5. Green-top White Silesian	11·62
3. Improved Imperial	12·58	6. Electoral	12·43

No. 2 was not, it is believed, properly earthed; hence, probably the lower amount of sugar.

June 12th.—The Rev. J. Jellett, F.T.C.D., in the chair. G. Sigerson, M.D., Professor of Botany in the Catholic University, read a paper on "Additions to the Flora of Botanical District No. 10 (Ireland)." This division having been imperfectly examined, Dr. Sigerson was able to ascertain the presence of 24 species additional to those given for it in the 'Cybele Hibernica.' The most interesting were *Cochlearia anglica* (determined, however, from the leaves only) and *Meconopsis cambrica.* Dr. Sigerson also read a "Note on an Anomalous Form of Corolla of *Erica.*" This was a state of *Erica Tetralix*, in which the corolla was partly split into segments. Dr. Sigerson stated that there was the further peculiarity that the stamens were partially adherent to the corolla, becoming free at the fissures. Mr. A. G. More mentioned having seen polypetalous states of *Campanula rotundifolia* and *Digitalis purpurea.*

ROYAL DUBLIN SOCIETY, *May 22nd.*—Professor Ball, A.M., in the chair. Professor Thiselton Dyer communicated a note on Bud-scales. He pointed out that in such widely distinct plants as the Lime, Elm, and Beech these were formed by the stipules, which were developed far in advance of the rest of the leaf, and fell off when it was fully expanded. This seemed an illustration of the theory that similar structural modifications in plants were really only the effect of similar external conditions. In more striking instances this would amount to so-called mimicry, which was really a totally different phenomenon from what was met with amongst animals. The term "Pseudomorphism" was suggested as a convenient substitute for those cases where a plant abandoned the *facies* of the Natural family to which it belonged, and assumed that of another.

NATURAL HISTORY SOCIETY OF DUBLIN.—*June 7th.*—Professor É. Perceval Wright, M.D., V.P., M.R.I.A., in the chair. Mr. William Andrews exhibited some specimens of Saxifrages, chiefly of the *umbrosa* and *Geum* species. Of the Robertsonian saxifrages, which constitute the *Geum* and *umbrosa* forms, the most remarkable varieties occur, which have been separated by British botanists into *Geum*, *elegans*, *dentata*, *hirsuta*, *umbrosa*, *punctata*, and *serrata*. It has been stated that those of the Pyrenees are peculiarly distinct, and that the forms found in Ireland are by no means identical or possessing the same characteristics; that the truly blunt crenate-leaved variety does not exist in Ireland. The author considered that all the forms of the Robertsonian saxifrages found in Ireland, in the south-west parts at certain elevations, were identical with those of similar ranges of elevation in the Pyrenees, and on the mountain ranges of Portugal. The singular fact of the peculiarly distinct varieties of form of the saxifrages may arise from their proximity to each other. In testing experiments with the seeds of *umbrosa*, he had found that the greater number of the seedling plants assumed the *Geum* form. All the varieties retained their characters permanently when cultivated from offsets. In the second edition of the 'British Flora,' by Sir William Hooker, the subject of the saxifrages, although fully given, is cautiously dilated on, especially with reference to the hypnoid group; and the observations of subsequent years have verified the views that were certainly then formed,—that the opinions of botanists were very variable as to what is and what is not a species. The common form of *Saxifraga umbrosa* of the western parts of Ireland varies much from the true *umbrosa* of the Pyrenees, the former having the leaves obovate, with sharp cartilaginous notches, the latter with the leaves bluntly crenate. All the forms of *Geum* found in Ireland are identical with those of the western parts of Spain and Portugal. Among the forms exhibited was a very fine species of *Geum*, found in the Great Blasket Island, coast of Kerry, at the extreme western point of that island, exposed to the western gales and sprays of the Atlantic. The drawing of the plant was taken from a specimen in full flower by the late George V. Du Noyer. This beautiful saxifrage is remarkable in having a series of glands of a rich rose colour, surrounding the base of the ovary, which gives a remarkable appearance to its inflorescence. Mr. A. G. More has noticed at the entrance of Dingle Harbour, exposed to the spray of the sea, remarkably large and strong forms of *Geum*. The author continued :—" Another form [*S. Andrewsii*] I wish to exhibit, in order that botanists in their excursions in this country may recognize it by its form of leaves. It has already been described by the late Dr. Harvey, and although so distinct from other forms of *umbrosa* in the foliage, yet in that variable group no specific separation could be formed on such characters. It is in the floral organs that the distinction is maintainable, and these are so remarkable that it would puzzle botanists to assert with certainty how hybridization could have produced characters of the ovary, which cause its affinity to plants whose periods of flowering and perfecting their seeds are at an early and late period of the season. This, as Mr. C. Watson expresses in the 'Cybele Britannica,' is a botanical puzzle, and one that renders it very difficult to withdraw from its botanical distinctness. I have lately given Mr. A. G. More the exact locality of this rare form, and fully expect that in the course of this summer he will be able to verify this as he has done other of my discoveries. I may refer to some remarkable specimens of *Saxifraga stellaris* obtained on moist rocks in one of those wild mountain retreats near Loc Coomeathcun, county Kerry. It appears very distinct from the more hirsute and more compact forms met on the Connor Cliffs opposite the Brandon range. The flowering stems are of far more elongated growth, and, what is remarkable, many produce in the axils of the bracts foliaceous buds. These characteristics ally it with *S. leucanthemifolia* of the Pyrenees, and decidedly to *S. foliolosa* of Robert Brown, described in Torrey and Gray's American Flora. On referring to notices already given of these forms of saxifrages, I was not surprised to find in the eleventh volume of the 'Annals of Natural History,' in an article by John Ball, Esq., a well-known European botanist, that he had gathered in the Otzal in the Tyrol the plant described as *S. leucanthemifolia*, Lapeyr., by Reichenbach and other German botanists, and is quite of the opinion of Bertoloni, that it is only a state of *S. stellaris*. Mr. Ball gives its characteristics, showing how near to or identical it is with some of the forms of *S. stellaris*. He mentions a variety of *S. stellaris* found by him in Curslieve, in Mayo, which is much more different from the ordinary form. It is larger, hairy, and somewhat viscose, the panicle widely spreading, the bracts foliaceous. He considers this to be the same as *S. Clusii*, variety α. of De Candolle's 'Prodromus.' Similar forms have been found by me in Kerry. The late Professor Kinahan mentioned to me that he had noticed in Mayo the singular form *S. Andrewsii*." These notes are merely intended as reference to the plants exhibited, not to any definite descriptions of their botanical characteristics.

Notice had been given at the General Meeting, held on the 5th of April last, "That it would be submitted to the members the necessity of the removal of the museum collections of the Society from Mr. Williams's rooms, Dame Street, and to adopt means for their further disposal." The following resolutions were proposed and seconded, and passed unanimously:—"That the following gentlemen be nominated to form a Committee for the purpose of reporting the best means for the disposal of the museum collections, viz. Professor Haughton, F.R.S.; R. P. Williams, Esq.; Dr. A. W. Foot; Robert J. Montgomery, Esq., and Arthur Andrews, Esq. That Mr. Montgomery be appointed to act as Secretary to the Committee. That the library of the Society be deposited in charge of the Treasurer, Mr. Arthur Andrews."

Botanical News.

The members of the Morocco Exploring Expedition returned to England in safety. Dr. Hooker arrived on Wednesday, the 20th June, by a private vessel, leaving the collector behind at Gibraltar to pack up the specimens, and follow by the regular steamer. The collections, both living and dried, have reached Kew in good condition, and their determination will soon be commenced; but of course, from the size and intricacy of the numerous large genera of the Mediterranean flora, this will be a work of considerable time and labour. The living plants consist principally of bulbs, Orchids, and Crassulaceæ, and the species which are suitable for general cultivation will, as they reach the proper condition, be figured in the 'Botanical Magazine.' The dried collection is estimated to contain at least 1000 species. The Atlas collection alone fills four large boxes, and no doubt will yield many interesting novelties, and enable us to understand clearly the general botanical characteristics of the only portion of the area of the rich Mediterranean flora, which up to the present time has remained totally unknown.

In the number of the 'Refugium Botanicum' which has recently appeared, Mr. Baker has described and figured a new genus of *Liliaceæ*, under the name of *Symea*. It is a plant from Chili, with the general habit of *Gagea*, but with green flowers with segments united in a short cup at the base, with only three small stamens from the throat of the cup, alternating with three minute membranous staminodia. The other two triandrous genera of capsular *Liliaceæ* are *Brodiæa* and *Leucocoryne*, both West American.

Mr. W. G. Smith has kindly forwarded us a letter, which he has just received from the celebrated fungologist Fries, containing some criticisms on the plates of the first part of 'Mycological Illustrations,' noticed in our last number (p. 222). We abstract the following notes:—"Tab. 1. *Cantharellum radicosum* nunquam legi, quare de acutis differentiis ignarus *A. umbonato* subjunxi. Ex icone vestra differentia facile elucet. 3. 1. *A. stiltatitius*, pictus stipite albo, in meo obscure cæruleus e glutine spisso inuncto. 3. 2. Statura omnino *Cortinarii callistei*, sed colores valde diversi, meus pure luteus, vester ferrugineus et optime quadrat in descriptionem *A. ferruginei*, Scop. Fl. Carn. ii. p. 423. 13. *A. fumosus*, sed non *A. polius*, Hymen. mon. ii. 16. Colore differt ab *Lact. pallido*, cujus icon in opere meo 'Sveriges ätliga Svampar,' potius fingerem *L. quietum*. 17. *Boletus amarus*, *B. pachypode* in 'Epicr.' subjunctus, sed forte diversus. Verus *B. pachypus*, pictus in 'Sveriges ätliga Svampar,' cum pl. *Boletis* et *Hydnis* carnosis. 20. *A. adnatus*, eximia nova species. 22. Non *Cort. cærulescens*, sed inter protei *C. cumatilis* formas."

Professor F. W. C. Areschoug, of Lund, who is engaged on a general monograph of the genus *Rubus*, and has already investigated the chief Continental collections, is at present in London examining the Herbaria of the British Museum, Kew, the Linnean Society, etc., and studying the living British forms in the field.

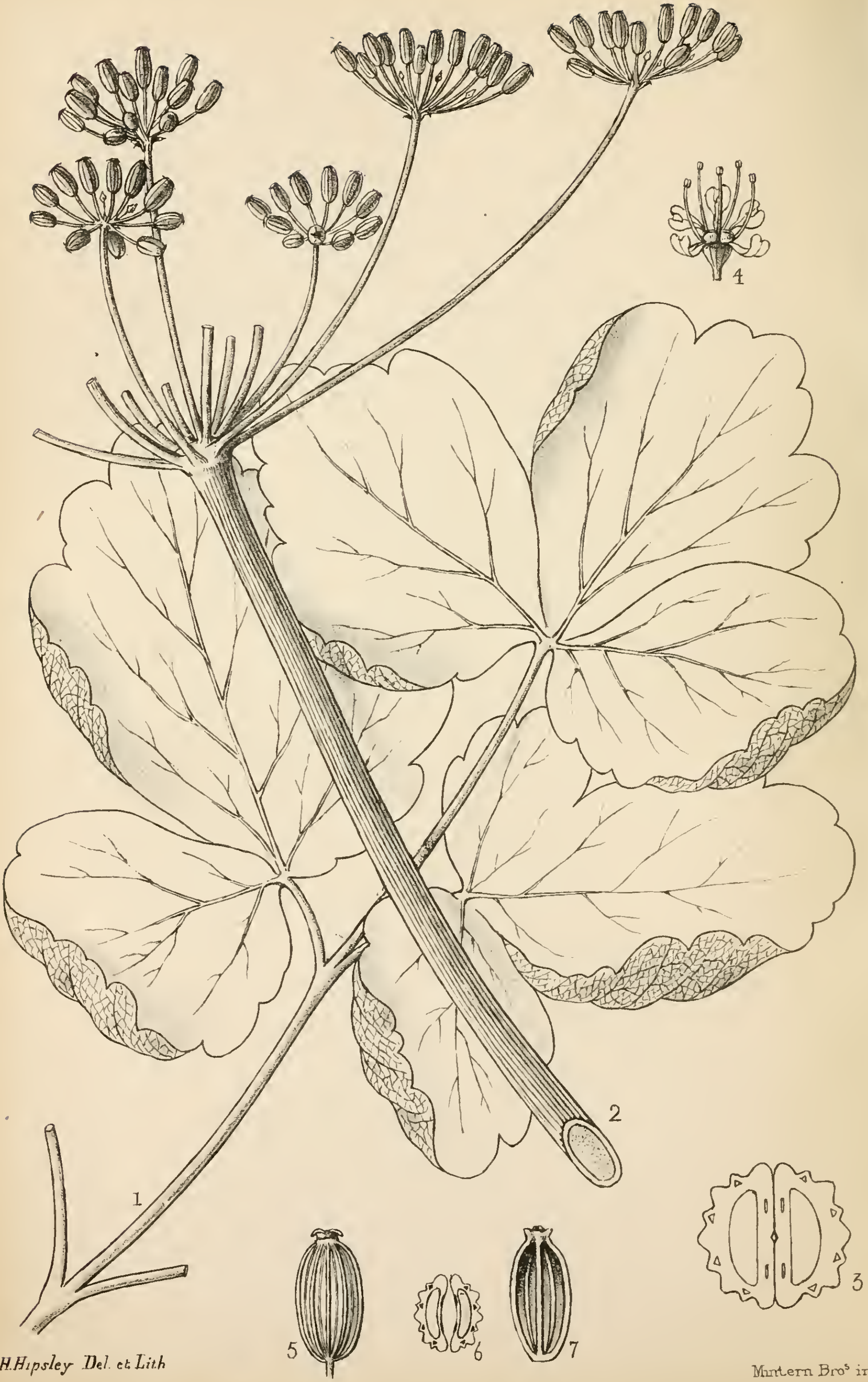
The 'Scottish Naturalist' for July contains the conclusion of the Rev. J. Keith's list of Mosses found in the vicinity of Forres, and extracts relating to Scottish plants from Dr. Boswell Syme's Report of the Botanical Exchange Club.

We learn with regret that M. Fourreau, known as a fellow-worker with M. Jordan in the preparation of the 'Icones,' was killed in one of the battles of the late war.

At a meeting of the Society of Biblical Archæology on July 4th, the Rev. B. T. Lowne read a paper on the Flora of Palestine; and Mr. J. Collins, on the Gums, Perfumes, and Resins mentioned in Scripture.

The excellent course of popular lectures on "The Natural History of a Flowering Plant," recently delivered in Dublin by Prof. Thiselton Dyer, and of which abstracts have been printed in the Dublin daily papers and the 'Gardeners' Chronicle,' are to be published in full. Such an introduction, elementary and yet on a level with the advanced science of the day, is much wanted.

COMMUNICATIONS have been received from:—Hon. J. L. Warren, W. Thiselton Dyer, J. Britten, R. Holland, F. J. Warner, W. Matthews, F. J. Hanbury, F. Evershed, Dr. Masters, Dr. Hance, W. G. Smith, J. Renny, Professor Areschoug, etc.



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Original Articles.

SILER TRILOBUM AS A BRITISH PLANT.

By Henry Trimen, M.B., F.L.S.

(Plate CXVIII.)

At p. 211 of the present volume, Mr. J. C. Melvill has placed on record his discovery of this Umbellifer in Cambridgeshire, first in May–June, 1867, and again found in May, 1871. It is at his request that I have written the following notes.

On July 10th last I had the pleasure of being guided by Professor C. C. Babington, of Cambridge, to the spot, and seeing the plant *in situ*. The locality is well described by Mr. Melvill, and the *Siler* grows amid the indigenous vegetation of the district; and though adjoining a very well-known spot, the "chalkpit close," at Cherry-Hinton, frequently mentioned by Ray, Martyn, and Relhan, it is a retired place, and one somewhat difficult of access. This may account for the species having been overlooked, for whether originally introduced or not, it must surely, to judge from the appearance of the plants, have existed in this spot for many years. It has been suggested that though noticed here, it had been confounded with *Smyrnium Olusatrum*, which grows within a few yards of it in the bushy hedge of the chalkpit close; such a confusion seems only likely when the plants are quite young. The number of individuals does not now probably exceed a dozen, but Mr. Melvill tells me that when he first noticed the plant, four years ago, the number was considerably larger, from fifty to sixty plants, cultivation having since invaded its then limits. Unless the presence of *Smyrnium Olusatrum* is so considered—and this grew here so far back as 1660 (Ray, Cat. Cant. p. 76)—there is nothing in the surrounding conditions of *Siler* to indicate an artificial origin, and I should have had little hesitation in admitting it into the native flora, were it not that Professor Babington informs me that Mr. Biggs, curator some thirty-five years back of the University botanic garden, is known to have been in the habit of sowing seeds in the neighbourhood. There is no evidence, so far as I know, tending to show that *Siler*, or any other plant now found about Cambridge, is the result of Mr. Biggs's seed-sowings, still the statement is one which it is necessary to take into consideration in attempting to determine the question as regards *Siler;* further data will be afforded by the exotic distribution of the species.

By the early botanists *Siler* was a name applied to several umbelliferous plants. The *Siler montanum* of Tragus, Lobel, Clusius, and others, is the species now called *Laserpitium Siler*, L. With reference to the plant of which I am writing, though it seems to have been known by report to C. Bauhin, it was not clearly distinguished till 1672, when Morison (Umbellif. p. 8) well described it under the appropriate name of *Siler Aquilegiæ foliis*, his figure, however (Hist. Oxon. iii. sect. 9. t. 3. f. 3), is but poor. As is somewhat frequently the case with plants which he had not seen, we find rather the reverse of progress in the knowledge of this species made by Linnæus, who either quite missed the plant, or confused it thoroughly with one or more species of *Laserpitium*, under the name of *L. trilobum*, from which genus, as defined by Linnæus, its fruit-characters entirely exclude it. This is well pointed out by Crantz (Stirp. Austriac. f. 3. p. 186), who places our plant in his genus *Siler*, in which, nevertheless, he unaccountably also includes Linnæus's *Laserpitium Siler* and *L. gallicum*. Though Crantz then is the founder of *Siler* as a genus in the post-Linnæan sense, the definition of Scopoli in the second edition of his 'Flora Carniolica' (vol. i. p. 217), who restricted it to the present species, is that generally quoted. Bentham and Hooker give (Gen. Plant. 908) Scopoli as the authority for the genus, with which they incorporate Hoffmann's *Agasyllis*. The technical characters of the fruit readily distinguish it.

SILER, *Scop.*—[*]Fruit glabrous, oval-oblong, slightly dorsally compressed; commissure wide, flat or slightly concave; carpels nearly semicircular on transverse section, each with 9 blunt prominent ribs, none of them winged, the 5 primary ribs rather thicker and more prominent than the 4 secondary ones, the 2 marginal ones especially prominent, forming with the adjacent ones of the other carpel a blunt double rim to the fruit; vittæ solitary, buried one in each secondary rib, and not visible on the surface of the fruit, two other vittæ in the face of the commissure; seed lenticular-compressed, flat or nearly so on the face; stylopod small, rather flat; styles persistent, closely reflexed over the stylopod. (When dry the dorsal compression of the carpels becomes much greater, and the ribs so much narrower and more prominent, as to have led to their being described as winged.)

S. TRILOBUM [Crantz, Austr. f. 3. p. 186 (1769)], Scopoli, Fl. Carn. ed. 2. vol. i. p. 217 (1772); De Cand. Prod. iv. 200. *Laserpitium trilobum*, L. Sp. 357 (ex parte) et plurim. auct. Europ. (non Crantz, nec Lapeyr. nec Rochel). *Siler aquilegifolium*, Spreng. Umb. 41; Gærtn. Fruct. p. 92; Mertens and Koch, Deutsch. Fl. ii. 368. *Laserpitium aquilegifolium*, Jacq. Austr. p. 29 (non Brotero, nec De Cand.). *L. austriacum*, Pallas in sched.

Rootstock vertical, thick, the upper portion clothed with the fibrous remains of the petioles of leaves of past years; *stem* erect, 4 to 6 ft. high, moderately branched, terete, striate, glabrous, glaucous, solid, branches stiff, rigid; *root-leaves* triternate on long petioles, the leaflets more or less deeply trifid, roundish, irregularly and very coarsely crenate, stem-leaves ternate, the leaflets less rounded, trifid, with more elongated segments, petiole dilated into a rigid sheathing base, all the leaflets thick, almost coriaceous, glabrous, shining dark clear green above, glaucous and elegantly veined beneath; *umbels* terminal, with 15 to 22 widely spreading branches, general involucre of 1 to 3 ovate-lanceolate deciduous bracts or 0, partial of 5 to 8 small lanceolate bracts, secondary umbels distant with 20–30 flowers, rather lax; *flowers* all regular, on long pedicels, petals distant, obovate-spathulate, with a narrow base, bifid, with a long inflexed point, white, when in bud pinkish, calyx with 5 minute teeth, stamens twice as long as the petals; *fruit* $\frac{5}{16}$ in. long, $\frac{2}{16}$ in. wide, slightly contracted below the stylopod, crowned with the persistent reflexed styles (for full description of the fruit, see generic characters).

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[*] When I collected the specimens from which the description is drawn, the flowering season had passed, and the fruit, though it had attained its full size, was not ripe, also I dug up no roots. In the description, therefore, the characters of the rootstock, the flowers, and the fully ripe fruit are taken from Continental specimens.

The rigid, perfectly solid stem and branches are remarkable, though not peculiar to *Siler*, amongst Umbellifers, when young they are covered with a very glaucous "bloom"; the leaves are very characteristic, much like those of Columbine, but thicker; as the plant gets old they gain, as well as the rest of the plant, a purplish tinge. At the point of origin of the radii of the primary umbel, the summit of the branch is dilated, and after the flowering period, forms a hemispherical head, the radii being then separated by intervening portions. The largest umbels from Cambridge measure more than 13 inches in diameter; in all the specimens the only fertile ones are those at the end of the main branches (and in these the central flowers are barren); those of the axillary branches—which overtop the terminal umbels, and in direction continue the axes—are always barren. The taste of the fruit is aromatic and bitter, not unlike that of *Smyrnium*.

The plant is figured in Morison's Hist. Oxon. l. c., Rivinus' Plant. Fl. Pentapet., Jacquin's Fl. Austr. Icones, vol. ii. t. 147, and Reichenbach's Ic. Fl. Germ. vol. xxi. fig. 1984. It is scarcely necessary to refer to the numerous descriptions in the Continental Floras; a very good one is that in Godron's 'Flore de Lorraine,' ed. 2. vol. i. p. 317.

Geographical Distribution.—There are specimens in the herbarium of the British Museum from Siberia (Pallas), Crimea (Pallas), Persia (Aucher Eloy, no. 4576), Austria (Jacquin, Mertens), Styria (Reichenbach, no. 2213, Prior, etc.), Hesse-Darmstadt (Bagge), Hanover (Pflumer), Lorraine (Billot. no. 785). It is also recorded from Provence, Bavaria, Hungary, Croatia, Transylvania, Slavonia, Central European Russia and the Caucasian provinces. De Candolle (l. c.) gives the Pyrenees, but he perhaps here mistook *Laserpitium Nestleri*, Soyer-Will., for this species. Morison states that he received it from Monte Gargano in Apulia. It appears to be absent from Scandinavia, Holland, Belgium, W. France, Switzerland (*Laserpitium trilobum*, Suter=*L. Gaudinii*, Moretti), and Portugal (*L. aquilegifolium*, Brotero=*L. Nestleri*, Soyer-Will.?). It seems, then, that *Siler* is a plant of decided eastern proclivities, its head-quarters being in Styria and adjacent districts of the Austrian Empire. The nearest points on the Continent to the Cambridge locality are the neighbourhood of Metz in Lorraine and the south-western portion of Hanover (Hildesheim, Bodenwerder, etc.). Bushy places on chalk and limestone, are the localities it affects, and it would appear to be in most places a local and sporadic species. If the Cambridgeshire station is a native one, it must be regarded as an isolated outlying post; points in its favour are, the quite similar character of the spot to those in which the plant is found abroad, and the exceptional climatological and geographical conditions of the district of England in which it is situated, shown by its remarkable flora, including two other Umbelliferæ all but restricted to it in England.

As to the systematic position of the genus, *Siler* is not very closely allied to any British *Umbelliferæ*. Bentham and Hooker, indeed, in Gen. Plantarum, place it with *Æthusa*, *Œnanthe*, and *Silaus* in the tribe *Œnantheæ*, but the presence of both secondary and primary ribs separates it both from these and all British genera, except the prickly-fruited ones, *Daucus*, *Caucalis*, and *Torilis*. If to be included in British floras, it will be necessary to employ for its reception a separate tribe or subtribe (*Sile-*

rineæ, Koch), which may be perhaps best placed between *Peucedaneæ* and *Daucineæ*.

[*Note.—Siler trilobum* has been so often confounded by botanical writers with a species (or perhaps two) of *Laserpitium*, that, as a supplement to the synonymy above given, it will be well to add that of *L. alpinum*, W. and K. The confusion has arisen in the absence of ripe fruit, from the great similarity of foliage; the carpels in *Laserpitium* have the secondary ribs expanded into membranous wings.

Laserpitium alpinum, Waldst. and Kit. Pl. Rar. Hung. t. 253. *L. trilobum*, L. (ex parte), Crantz, Austr. f. 3. p. 187; Rochel, Pl. Banat. Rar. p. 65, and tab. xxvii. fig. 53; Lapeyr. Abr. Pyren. 151 (non auct. alior.). *L. aquilegifolium*, De Cand. Fl. Franc. v. p. 510, and Prod. iv. 204; Brot. Fl. Lusit. i. 427? (non Jacq.). *Siler alpinum*, Baumgartn. En. i. n. 495. *L. Nestleri*, Soyer-Willemet, Obs. Bot. (conf. Gren. and Godr. Fl. Franc. i. p. 680).

Whether the Pyrenæan plant is distinct from the Austrian is an undecided point. Nyman in his 'Sylloge' keeps them separate, but I cannot trace any very good characters. Soyer-Willemet's 'Observations,' which would no doubt throw great light on the subject, I have not been able to see.]

Explanation of Plate CXVIII.—*Siler trilobum*, Scop. Fig. 1. Portion of root-leaf. Fig. 2. Portion of umbel with nearly ripe fruit. Fig. 3. Section of nearly ripe fruit × 7. Fig. 4. Flower × . Fig. 5. Ripe fruit × 2. Fig. 6. Transverse section of ripe fruit × 2. Fig. 7. Commissure of ripe carpel × 2. Figs. 1, 2, and 3, from specimens collected by Dr. Trimen in July 1871 at Cherry Hinton, near Cambridge. Fig. 4 altered from Jacquin's Ic. Fl. Austr. Figs. 5, 6, and 7, from Styrian specimens in the herbarium of the British Museum.

ON THE DISPERSION OF MONTANE PLANTS OVER THE HILLS OF THE NORTH OF ENGLAND.

By J. G. Baker, F.L.S.

We have in the North of England four separate tracts of hilly country, in each of which, over a considerable extent of surface, a particular kind of rock, or more than one kind combined, are accumulated in masses so that each area presents distinctly marked orographic and lithological characteristics. The botany of each of these four ranges has now been very thoroughly explored, so that I believe we may safely take for granted that very little still remains to be done in ascertaining which of the Montane species grow in each of the four areas, and which are absent. I propose, therefore, in the present paper to go through the list of Montane plants, and examine how they are distributed through the four masses, not quoting special stations in detail, as these are mostly in print already, but simply noting in brief general terms the rarity or commonness of the plant in each particular tract, and indicating which of the species of the two Boreal-montane types have made themselves at home in some of the ranges, but are absent from others; so as to bring together in one view a compendious summary of the facts of the subject.

The four ranges of hill may be named and characterized as follows, viz.:—

1. *The Porphyritic Hills.*—The Cheviot mass, composed entirely of igneous rocks of a porphyritic character, situated partly in the north-west of Northumberland, and partly in Roxburghshire. Like all the others, this has its base in Mr. Watson's Midagrarian zone. There may be a square mile of area that rises into his Arctic zone, the two highest peaks reaching 2348 and 2676 feet, but the upper part of these peaks is very bare and monotonous, and almost destitute of damp precipice; and I know of only seven Montane species that grow there above 650 yards. I am leaving out of account entirely in this paper that portion of the Cheviot mass that falls within Scotland, which I have not had the opportunity of exploring personally. That portion which falls within Northumberland is about 200 square miles in area, and is drained by branches of the Tweed and Coquet.

2. *The Carboniferous Hills.*—The area which I am including here under this head is that portion of the Pennine chain that falls between the Tyne and the Wharf. It embraces an area of at least a thousand square miles, belongs entirely to the eastern slope of the Pennine ridge, and fills up the whole of the western part of North Yorkshire, Durham, and the southern part of Northumberland. The following streams run through it from west to east:—the Wear, Tees, Swale, and Yore; and the hills between them rise very gradually as we ascend the streams, culminating in several isolated peaks and ridges that reach into the Inferarctic, but none into the Midarctic zone. The rocks consist of several important bands of homogeneous encrinitic limestone, with thick masses of intervening and superposed clays and sandstone, and in Teesdale a considerable mass of basalt is interposed amongst the sedimentary strata.

3. *The Slate Hills* of the Westmoreland and Cumberland Lake district occupy an area of about 400 square miles. The main lakes which are interspersed amongst them are all decidedly within 100 yards of the sea level. The following peaks exceed 900 yards:—Scawfell Pikes (which reaches 3208 feet), Scawfell, Helvellyn, Fairfield, Skiddaw, Bowfell, Great Gable, Saddleback, Grassmoor, St. Sunday Crag, and High Street. These spread over an area of not less than 20 miles from east to west, and of 10 miles from north to south, and of most of them some at least of the sides are abrupt and precipitous. We may fairly regard all these peaks that have been mentioned as rising into the Midarctic zone; so that in this point, and also in its much greater rainfall, as well as in its lithological constitution, this group differs from all the other three.

4. *The Oolitic Hills* of North-East Yorkshire, which, with the Lias upon which they rest, occupy an area of 850 square miles. The Middle Oolite, which, running from east to west, fills up the southern third of this area, is almost entirely calcareous in lithological constitution. The Lower Oolite and Lias of the lower levels and northern two-thirds of the area are arenaceous and aluminaceous. Numerous streams, running principally north and south, break up the mass, the general character of which is that of an elevated table-land, into dales and glens. None of the higher peaks and ridges exceed 1500 feet, so that this mass is decidedly lower than the three others, and does not anywhere attain even the Inferarctic zone.

I am not taking into account at all the low hills of the centre of Northumberland, or of the western slope of the Pennine chain through Cumberland and Westmoreland, or its extension through the West Riding of Yorkshire, or of the range of Limestone hills that bounds the Slate hills of the lake country on the south, stretching from Kendal westward, past Milnthorpe and Arnside Knot, to the coast at Silverdale and Humphry Head; all of which are similar in their lithology and botany to tract No. 2, and yield very few additional species.

List of Species.

1. *Thalictrum alpinum.* Unknown in the Porphyry and Oolite. In the Slate on high damp crags of Helvellyn, Fairfield, and the Scawfell group of summits. In the Carboniferous tract confined to the superagrarian basaltic crags of Teesdale.

2. *Thalictrum minus*, var. *montanum.* Unknown in the Porphyry and Oolite; in the Slate, on a few superagrarian crags of the Skiddaw group only; in the Carboniferous tract in one place only in Arkendale, on a limestone scar. Var. *flexuosum*, in the Slate tract frequent amongst the large lakes; in the Carboniferous tract scattered through the Midagrarian zone in Teesdale, but not known in any of the other valleys; unknown among the Porphyry and Oolite.

3. *Trollius europæus.* Occurs more or less plentifully in all the four tracts, ascending in Teesdale to the Inferarctic zone.

4. *Thlaspi alpestre.* Unknown in the Porphyry and Oolite. Reported doubtfully or on doubtful authority from two places in the Slate district, and requiring confirmation before it can be accepted. In the Carboniferous tract, known in a dozen or more good stations, always about lead-mines, ranging in level from 100 to 750 yards.

5. *Subularia aquatica.* Unknown in the Porphyry, Oolite, and Carboniferous tracts. In the Slate district in two of the large lakes.

6. *Draba incana.* Porphyry and Oolite unknown. Slate, reported from a single station on doubtful authority. Frequent in the Carboniferous tract on the high limestone cliffs in all the dales from the Wear to the Yore.

7. *Arabis petræa.* Unknown in the Porphyry, Oolite, and Carboniferous tracts. In the Slate district in two stations amongst the Scawfell group of summits.

8. *Viola lutea.* Occurs in all the four tracts; in the Oolite in two places only; much more plentifully in the Carboniferous tract than in any of the other three.

9. *Drosera anglica.* Unknown in the Porphyritic and Carboniferous tracts. Two stations each in the Slate and Oolite.

10. *Silene acaulis.* Unknown in the Porphyry, Oolite, and Carboniferous tracts. Several stations amongst the higher peaks of the Slate country.

11. *Lychnis alpina.* Unknown in the Porphyry, Oolite, and Carboniferous tracts. In the Slate district near the summit of one of the peaks of second-rate height, at about 2000 feet.

12. *Arenaria verna.* Universally distributed amongst the hills and dales of the Carboniferous tract, ascending to the Inferarctic zone. In the Slate known in two places only on precipices of the Inferarctic zone. Unknown among the Porphyry and Oolite.

13. *Arenaria uliginosa.* In the Carboniferous tract on one hill in Teesdale at 5–600 yards. Unknown in the other three districts.

14. *Stellaria nemorum.* Unknown in the Porphyry. Scattered through the dales of the Slate, Carboniferous, and Oolitic tracts, just reaching (one station) into the Superagrarian zone.

15. *Cerastium alpinum.* Unknown in the Porphyry, Carboniferous, and Oolite districts. In the Slate tract on three hills on precipices of the Inferarctic zone.

16. *Geranium sylvaticum.* More or less abundant in all the four districts, but not seen anywhere above the Agrarian region.

17. *Vicia sylvatica.* Scattered in Midagrarian woods of the Carboniferous, Slate, and Oolitic tracts. Not known in the Porphyry.

18. *Prunus Padus.* Frequent throughout all the four districts within the limits of the Agrarian region.

19. *Dryas octopetala.* In Teesdale in one good station on Limestone at 550 yards. Unknown in the Slate, Porphyry, and Oolitic tracts.

20. *Potentilla fruticosa.* In the Carboniferous tract extending in Teesdale 20 miles along the river in the Midagrarian and lower half of the Superagrarian zone. In the Slate district in a single ravine of the Scawfell group of summits. Unknown in the Oolite and Porphyry.

21. *P. alpestris.* Carboniferous tract in three or four different stations in Teesdale, and one in Wensleydale. In the Slate tract known in one place only. Unknown among the Oolite and Porphyry.

22. *Rubus Chamæmorus.* In the Carboniferous and Porphyritic tracts universally distributed through the Arctic region, and though casually descending below it, yet generally furnishing in climbing a hill the best botanical indication that a height of 600 or 650 yards is reached. Unknown of course in the Oolitic tract. In the Slate tract it does occur on a few of the eastern ridges and peaks, but although I specially looked for it, I saw it nowhere in the Skiddaw, Helvellyn, or Scawfell group of summits, or indeed anywhere in the central or western thirds of the Lake Slate hills.

23. *R. saxatilis.* Scattered in the dale woods and amongst the lower precipices of all the four districts.

24. *Alchemilla alpina.* Unknown in the Porphyry, Oolite, and Carboniferous tracts. Common amongst the precipices of most of the higher hills of the Slate district, ascending to 950 yards on Great Gable, descending to within 100 yards of the sea-level in Wastdale.

25. *Epilobium anagallidifolium.* Unknown in the Slate and Oolite tracts. In the Porphyry, near the top of two of the ravines (Superagrarian or perhaps Inferarctic zone). In the Carboniferous district in one locality in the Durham part of Teesdale in the Superagrarian zone.

26. *E. alsinifolium.* Unknown in the Oolitic tract. Abundant in the Porphyritic, Carboniferous, and Slate tracts in streamlets of the Superagrarian and Inferarctic zones.

27. *Circæa alpina.* Absent from the Porphyritic, Carboniferous, and Oolitic tracts. In numerous stations in the Slate tract about the Lake sides and through the Superagrarian zone.

28. *Ribes petræum.* Unknown in the Porphyritic and Oolitic hills. Only two or three stations known in the Slate tract in the Midagrarian zone. In numerous localities in the Carboniferous dales, ascending to 500 yards on the Teesdale basaltic crags.

29. *Sedum Rhodiola.* In one station in the Porphyry, in a ravine at 400 yards. In the Carboniferous tract known formerly in one station in

Teesdale on the basalt, but not seen lately. In many localities in the Slate tracts on the damper precipices of the Superagrarian and Inferarctic zones.

30. *S. villosum.* Scattered widely over the Porphyritic and Carboniferous hills. Unknown in the Oolite. In the Slate reported from two stations, but never seen by myself.

31. *Saxifraga stellaris.* Scattered over the Porphyritic peaks and down their sides. Universally distributed amongst the Slate hills from the Midarctic peaks down to the Lake shores. In the Carboniferous tract known in Tynedale, Weardale, and Teesdale, but not seen in Swaledale or Yoredale. Unknown in the Oolitic tract.

32. *S. nivalis.* Unknown in the Porphyry, Oolitic, and Carboniferous tracts. In the Slate district in three or four stations on damp Inferarctic precipices.

33. *S. Hirculus.* Not known anywhere in the Porphyritic, Oolitic, and Slate tracts. In the Carboniferous district in about half-a-dozen different stations in Teesdale and Weardale.

34. *S. aizoides.* Nearly or quite as frequent in the Slate district as *S. stellaris*, descending as low, but not ascending quite so high. In the Carboniferous tract, abundant in Teesdale, but not known elsewhere. Absent from the Porphyry and Oolite.

35. *S. oppositifolia.* Absent from the Porphyritic, Oolitic, and Carboniferous districts. Damp precipices of the Inferarctic zone in the Slate tract on Glaramara, Helvellyn, and Scawfell.

36. *S. hypnoides.* Unknown among the Oolitic hills. Widely spread through the three other groups of hills, ascending in each from the Midagrarian to the Inferarctic zone.

37. *Parnassia palustris.* Frequent in swampy places in all the four districts through the Agrarian region.

38. *Cornus suecica.* In one long-known station in the Porphyry, and three places in the Oolite in the Midagrarian zone. Unknown in the Slate and Carboniferous hills.

39. *Meum athamanticum.* Unknown amongst the Porphyry and Oolite. In the Carboniferous tract not seen lately, but one station recorded on old authority. Two or three stations in the Slate tract in the Midagrarian zone.

40. *Galium boreale.* Unknown amongst the Porphyry. One station in the Oolite recorded on old authority; probably a mistake. In the Carboniferous tract common in Teesdale, along twenty miles of the river, and occurring also in Tynedale and Swaledale. In the Slate district on the shore of most of the lakes, and ascending sparingly to the mountain precipices, but not known anywhere above the Agrarian region.

41. *Crepis paludosa.* Frequent in damp woods and meadows in all the four tracts throughout the Agrarian region.

42. *Hieracium alpinum* (*holosericeum*, Backh.). Unknown in the Carboniferous, Oolitic, and Porphyritic districts. In the Slate on precipices of the Inferarctic zone on Glaramara, Scawfell, and Langdale Pikes.

43. *H. pulmonarium* (*chrysanthum*, Backh.). Unknown in the Carboniferous, Oolitic, and Porphyritic districts. In the Slate on high precipices of Helvellyn, Glaramara, and Scawfell.

44. *H. pallidum*, including *lasiophyllum*. Moderately frequent amongst

the precipices of the Porphyritic, Slate, and Carboniferous districts. Unknown in the Oolitic tract.

45. *H. argenteum.* Two or three stations only in the Slate and Porphyry. Unknown in the Oolitic and Carboniferous hills.

46. *H. Lawsoni.* Unknown in the Porphyry and Oolite. Numerous stations scattered over the Slate tract. In the Carboniferous district in several places in Teesdale and Swaledale, but not known elsewhere.

47. *H. iricum.* Unknown amongst the Slate, Oolite, and Porphyry. In the Carboniferous tract frequent in Teesdale through the Superagrarian zone, but not known in any of the other dales.

48. *H. gothicum.* One station each in the Porphyry and Oolite. Scattered over the Slate and Carboniferous tracts.

49. *H. strictum.* Two stations only in the Slate tract. Unknown in the other three districts.

50. *H. crocatum.* Streamsides of the Agrarian region zone in all the four districts, but in the Oolite in one station only.

51. *H. corymbosum.* One station in the Porphyry. In the Carboniferous tract plentiful in Teesdale, and occurring also in Swaledale and Yoredale. Unknown amongst the Slate and Oolite.

52. *H. prenanthoides.* One station in the Porphyry. In the Carboniferous tract, unknown in Teesdale, which is much the richest valley for the genus in general, but there are single stations each in Tynedale, Swaledale, and Yoredale. Unknown in the Slate and Oolite.

53. *Saussurea alpina.* In the Slate tract, one station long known in Helvellyn at 8900 yards. Unknown in the other three districts.

54. *Carduus heterophyllus.* Frequent in the dale woods and meadows of the Slate and Carboniferous hills. Occurs also in the Porphyry, and in one place in the Oolite.

55. *Gnaphalium dioicum.* Widely spread over all the four districts.

56. *Campanula latifolia.* Frequent in the four districts; rare above the Midagrarian zone.

57. *Lobelia Dortmanna.* Unknown in the Porphyry, Oolite, and Carboniferous tracts. Plentiful in the Slate tract in all the large lakes, and ascending in the tarns up to 500 yards.

58. *Arbutus Uva-ursi.* Unknown in the Porphyry and Oolite. In two or three stations each in the Carboniferous and Slate tracts in the Superagrarian zone.

59. *Vaccinium uliginosum.* Unknown in the Porphyritic, Slate, and Oolitic tracts. In the Carboniferous tract in one isolated station in Teesdale, and two or three in the Midagrarian zone in Tynedale.

60. *V. Vitis-Idæa.* Frequent in all the four districts, in each ascending to nearly the summits of the highest peaks.

61. *Pyrola media.* Unknown in the Porphyritic tract. Scattered through the three other districts in the Midagrarian zone only.

62. *P. minor.* Like the preceding, not known in the Porphyry, and scattered through the three other districts, but ascending in the Carboniferous tract into the Superagrarian zone.

63. *P. secunda.* Unknown in the Oolite. Known in one station each in the Porphyritic and Carboniferous tracts, and in two in the Slate district.

64. *Bartsia alpina.* Plentiful in the Carboniferous tract in Upper Teesdale on both sides of the river. Unknown elsewhere.

65. *Melampyrum sylvaticum.* Unknown in the Porphyry and Oolite.

Known with certainty in the Carboniferous tract in one station in Teesdale. Reported from several stations in the Slate district, but I have never seen either living or dried specimens, and the name is very frequently misapplied.

66. *Orobanche rubra.* One station in the Carboniferous tract on a Limestone scar. Unknown elsewhere.

67. *Myosotis alpestris.* In the Carboniferous tract in one place on Micklefell, in the Inferarctic zone. Unknown elsewhere.

68. *Trientalis europæa.* Unknown in the Porphyry. Scattered widely over the Carboniferous, Oolitic, and Slate hills in the Agrarian region.

69. *Polygonum viviparum.* Unknown in the Oolite and Porphyry. In the Carboniferous tract in Teesdale, Weardale, and Wensleydale in numerous stations over a range in elevation from 200 to 550 yards. In the Slate district known only on the Red Tarn slope of Helvellyn.

70. *Rumex aquaticus.* Given by Mr. Watson as a plant of the Lake province, but I do not know of any special station among the Lake hills. In the Carboniferous tract, frequent in most of the dales, ascending to 450 yards.

71. *Empetrum nigrum.* A common plant over all the four ranges of hill, in each ascending to the highest peaks.

72. *Salix nigricans.* Unknown in the Slate tract, but most likely overlooked. Widely scattered in the dales of the three other tracts.

73. *S. phylicifolia.* Abundant in the dales of the Carboniferous tract up to 500–550 yards, but not known in any of the other three districts.

75. *S. herbacea.* Unknown in the Carboniferous, Oolitic, and Porphyritic tracts. In the Slate tract on ten or a dozen of the highest peaks, probably on all those that attain the Inferarctic zone.

76. *Listera cordata.* Widely scattered through all the four districts, but not known above the Agrarian region.

77. *Tofieldia palustris.* In the Carboniferous tract plentiful, in Teesdale on both sides of the river through the Superagrarian zone. Not known anywhere else.

78. *Juncus triglumis.* In the Carboniferous tract in one good station in Teesdale. In three or four places on the Slate hills in the Arctic zone. Unknown in the other two districts.

79. *Luzula spicata.* Unknown in the Porphyritic, Oolitic, and Carboniferous tracts. In the Slate district in two places on Fairfield and Helvellyn.

80. *Kobresia caricina.* In the Carboniferous tract plentiful on both sides of the river in Teesdale through the Superagrarian zone. Unknown in the three other tracts.

81. *Carex dioica.* Widely spread in all the four districts through the Agrarian region.

82. *C. pauciflora.* In the Oolitic tract in two or three places. Unknown in the others, but a very likely plant to be overlooked.

83. *C. rigida.* Unknown in the Oolite. In the other three districts occurring on the peaks that reach the Arctic zone.

84. *C. capillaris.* In Teesdale on both sides of the river in the Superagrarian and Inferarctic zones. Unknown in the three other districts.

85. *Sesleria cærulea.* Frequent in the dales of the Carboniferous tract, especially in Teesdale, ascending to 800 yards. Unknown in the other three districts.

86. *Melica nutans.* Unknown in the Porphyry. Widely spread through each of the three other tracts in the Agrarian region.

87. *Poa alpina.* Unknown in the Porphyritic, Carboniferous, and Oolitic tracts. In the Slate district in one place on Helvellyn.

88. *Festuca sylvatica.* Unknown in the Oolite and Porphyry. In the Carboniferous tract in one station, and in the Slate tract in three or four, all in the Midagrarian zone.

89. *Woodsia ilvensis.* Unknown in the Porphyry and Oolite. In one station in the Carboniferous, and in four or five in the Slate district.

90. *Polypodium Phegopteris.* Widely dispersed through all the four, ranges both horizontally and vertically, reaching 800 yards in the Lakes.

91. *P. Dryopteris.* Dispersion just like that of the last, reaching 700 yards in Teesdale.

92. *Allosorus crispus.* Found in all the four ranges, but very rare in the Oolite, and specially abundant in the Slate, where it is dispersed universally horizontally, and climbs vertically from the Lake sides to the highest peaks.

93. *Aspidium Lonchitis.* Unknown in the Porphyry and Oolite. One station in the Carboniferous tract in Teesdale, and three or four have been ascertained in the Slate range.

94. *Asplenium viride.* Known in all the four ranges, but very rare in the Oolite and Porphyry. Commonest in the Carboniferous tract on the limestone scars, ascending to 800 yards.

95. *A. septentrionale.* Unknown in the Porphyritic, Oolitic, and Carboniferous tracts. In several stations in the Slate district in the Midagrarian and Superagrarian zones.

96. *Lycopodium annotinum.* Unknown in the Porphyritic, Oolitic, and Carboniferous tracts. In the Slate district, plentiful on one hill only (Bowfell).

97. *Lycopodium alpinum.* Widely dispersed through all the four ranges, ascending to 1000 yards on Skiddaw.

98. *L. selaginoides.* Similar to the last in its dispersion, ascending to 900 yards on Helvellyn.

99. *Isoetes lacustris.* In the Slate district plentiful in all the large lakes, and occurring also in most of the tarns. Quite unknown in the three other ranges.

100. *Equisetum umbrosum.* In Teesdale, along ten miles of the river, principally in the Superagrarian zone. Not known in the other three ranges.

101. *E. hyemale.* Unknown in the Porphyry. Scattered sparingly in the other three districts, but not known above the Midagrarian zone.

102. *E. variegatum.* In Teesdale over a range of from 250 to 500 yards. In the Slate district reported by Winch from a single station. Not known in the Porphyritic and Oolitic ranges.

The occurrence or absence of the species in each range will be shown most clearly by the table on page 268.

In looking over the lists, the following comments of a general character suggest themselves:—

1. With regard to the Porphyritic tract, the paucity of Montane plants, as counted both by species and individuals, is remarkable when we consider the area that it occupies and the height to which it reaches, and that it is considerably more northern in position than the other three ranges.

	Porphyry.	Slate.	Carboniferous.	Oolite.
Thalictrum alpinum	...	*s*	*c*	...
,, minus	...	*s*	*c*	...
Trollius europæus	*p*	*s*	*c*	*o*
Thlaspi alpestre	...	*s*	*c*	...
Subularia aquatica	...	*s*	...	...
Draba incana	...	...	*c*	...
Arabis petræa	...	*s*	...	...
Viola lutea	*p*		*c*	*o*
Drosera anglica	...	*s*	...	*o*
Silene acaulis	...	*s*	...	...
Lychnis alpina	...	*s*	...	...
Arenaria verna	...	*s*	*c*	...
,, uliginosa	...	...	*c*	...
Stellaria nemorum	...	*s*	*c*	*o*
Cerastium alpinum	...	*s*	...	...
Geranium sylvaticum	*p*	*s*	*c*	*o*
Vicia sylvatica	...	*s*	*c*	*o*
Prunus Padus	*p*	*s*	*c*	*o*
Dryas octopetala	...	...	*c*	...
Potentilla fruticosa	...	*s*	*c*	...
,, alpestris	...	*s*	*c*	...
Rubus Chamæmorus	*p*	*s*	*c*	...
,, saxatilis	*p*	*s*	*c*	*o*
Alchemilla alpina	...	*s*	...	...
Epilobium anagallidifolium	*p*	...	*c*	...
,, alsinifolium	*p*	*s*	*c*	...
Circæa alpina	...	*s*	...	...
Ribes petræum	...	*s*	*c*	...
Sedum Rhodiola	*p*	*s*	...	...
,, villosum	*p*	*s*	*c*	...
Saxifraga stellaris	*p*	*s*	*c*	...
,, nivalis	...	*s*	...	...
,, Hirculus	...	...	*c*	...
,, aizoides	...	*s*	*c*	...
,, oppositifolia	...	*s*	...	...
,, hypnoides	*p*	*s*	*c*	...
Parnassia palustris	*p*	*s*	*c*	*o*
Cornus suecica	*p*	...	...	*o*
Meum athamanticum	...	*s*	*c*	...
Galium boreale	...	*s*	*c*	...
Crepis paludosa	*p*	*s*	*c*	*o*
Hieracium alpinum	...	*s*	...	...
,, pulmonarium	...	*s*	...	...
,, pallidum	*p*	*s*	*c*	...
,, argenteum	*p*	*s*	...	...
,, Lawsoni	...	*s*	*c*	...
,, iricum	...	...	*c*	...
,, gothicum	*p*	*s*	*c*	*o*
,, strictum	...	*s*	...	...
,, crocatum	*p*	*s*	*c*	*o*
,, corymbosum	*p*	...	*c*	...
,, prenanthoides	*p*	...	*c*	...
Saussurea alpina	...	*s*	..	
Carduus heterophyllus	*p*	*s*	*c*	*o*
Gnaphalium dioicum	*p*	*s*	*c*	*o*
Campanula latifolia	*p*	*s*	*c*	*o*
Lobelia Dortmanna	...	*s*	...	...
Arbutus Uva-ursi	..	*s*	*c*	...
Vaccinium uliginosum	...	...	*c*	...
,, Vitis-idæa	*p*	*s*	*c*	*o*
Pyrola media	...	*s*	*c*	*o*
,, minor	...	*s*	*c*	*o*
,, secunda	*p*	*s*	*c*	...
Bartsia alpina	...	...	*c*	...
Melampyrum sylvaticum	...	...	*c*	...
Orobanche rubra	...	...	*c*	...
Myosotis alpestris	...	...	*c*	...
Trientalis europæa	...	*s*	*c*	*o*
Polygonum viviparum	...	*s*	*c*	...
Rumex aquaticus	...	...	*c*	...
Oxyria reniformis	...	*s*	...	...
Empetrum nigrum	*p*	*s*	*c*	*o*
Salix nigricans	*p*	...	*c*	*o*
,, phylicifolia	...	...	*c*	...
,, herbacea	...	*s*	...	...
Listera cordata	*p*	*s*	*c*	*o*
Tofieldia palustris	...	...	*c*	...
Juncus triglumis	...	*s*	*c*	...
Luzula spicata	...	*s*	...	...
Kobresia caricina	...	...	*c*	...
Carex dioica	*p*	*s*	*c*	*o*
,, pauciflora	...	...	...	*o*
,, rigida	*p*	*s*	*c*	...
,, capillaris	...	...	*c*	...
Sesleria cærulea	...	...	*c*	...
Melica nutans	...	*s*	*c*	*o*
Poa alpina	...	*s*	...	...
Festuca sylvatica	...	*s*	*c*	...
Woodsia ilvensis	...	*s*	*c*	...
Polypodium Phegopteris	*p*	*s*	*c*	*o*
,, Dryopteris	*p*	*s*	*c*	*o*
Allosorus crispus	*p*	*s*	*c*	*o*
Aspidium Lonchitis	...	*s*	*c*	...
Asplenium viride	*p*	*s*	*c*	*o*
,, septentrionale	...	*s*	...	...
Lycopodium annotinum	...	*s*	...	...
,, alpinum	*p*	*s*	*c*	*o*
,, selaginoides	*p*	*s*	*c*	*o*
Isoetes lacustris	...	*s*	...	...
Equisetum umbrosum	...	...	*c*	...
,, hyemale	*p*	*s*	*c*	*o*
,, variegatum	...	*s*	*c*	...
Total number	38	79	76	33

Its species, it will be noticed, belong, with very slight exception, to both the Carboniferous and Slate ranges. The montane botany of the Porphyry is just that of the two more southern ranges, with a large deduction.

2. Remembering the lower altitude reached by the Oolitic range, its drier rocks and lower rainfall, it might naturally be expected to yield much fewer Montane plants than the other three masses, and this expectation is fulfilled. The most striking instances of plants frequent in the three other ranges and absent here, are furnished by *Rubus Chamæmorus*, *Epilobium alsinifolium*, *Sedum villosum*, *Saxifraga stellaris* and *hypnoides*, *Hieracium pallidum*, and *Carex rigida*.

3. Of the twenty-four species that occur in the Slate mass, but are absent from the Carboniferous range, eight only may fairly be called frequent. These eight are *Silene acaulis*, *Alchemilla alpina*, *Circæa alpina*, *Sedum Rhodiola*, *Lobelia Dortmanna*, *Oxyria reniformis*, *Salix herbacea*, and *Isoetes lacustris*. Of these twenty-four species, three,—*Subularia aquatica*, *Lobelia Dortmanna*, and *Isoetes lacustris*,—one rare, two common, grow submerged in the lakes; one species only, *Salix herbacea*, belongs distinctly to the hill-peaks, which in this mass, out of the four only, reach the mid-arctic zone; and ten species, —*Arabis petræa*, *Lychnis alpina*, *Cerastium alpinum*, *Saxifraga nivalis*, *S. oppositifolia*, *Hieracium alpinum*, *H. pulmonarium*, *Saussurea alpina*, *Luzula spicata*, and *Poa alpina*,—are rare plants of the precipices of the Inferarctic zone, of which there are very few in the Carboniferous tract. The vertical and horizontal ubiquity of *Allosorus crispus* in the Slate tract is also a positive characteristic that should be taken into account, as one of its prominent botanico-geographical features; and the ubiquity of *Salix herbacea* on its peaks of the Mid-arctic zone.

4. Although for the restriction of most of the twenty-four species to the Slate mass, which grow there but not in the Carboniferous tract, it is not difficult to find a plausible reason, it is not the same for the presence of the twenty-four species in the Carboniferous tract which are absent from the Slate, the names of which a glance at the table just given will show. For four of them,—*Draba incana*, *Dryas octopetala*, *Orobanche rubra*, and *Sesleria cærulea*,—we may, no doubt, safely account on the score of a distinct preference for the limestone. But still twenty species remain, for the occurrence of which here, and not in the Slate hills, I cannot venture to allege any cause; and the occurrence of these twenty species under such conditions seems one of the most curious problems which the geographical botany of the centre of the island offers for our solution. Of these twenty species, ten are restricted to Teesdale. All the twenty are mainly or entirely plants of the Agrarian region, confined to, or with their head-quarters in, the Superagrarian zone. In addition to the presence of these species here which are absent from the Slate, the following, which are rare or very rare in the latter, are much more abundant in the eastern mass, viz. *Thlaspi alpestre*, *Viola lutea*, *Arenaria verna*, *Potentilla fruticosa*, *Rubus Chamæmorus*, *Sedum villosum*, *Asplenium viride*, and *Equisetum variegatum*. I should not omit, also, to mention the abundance of *Gentiana verna* in Teesdale, in contrast with its absence from the Slate in this connection, although standing as an "Intermediate" in the 'Cybele,' it has not been included in my catalogue. The ubiquity of *Rubus Chamæmorus* on the Inferarctic Carboniferous peaks is also a salient character of contrast.

5. Note, in conclusion, that there are only twenty-three species found in all the four masses, and that six of these are very rare in the Oolite, leaving only seventeen montane plants which may be considered as dispersed up to a standard of moderate frequency through the four ranges.

SHORT NOTES AND QUERIES.

BROMUS ASPER, *L.*, *Beneken.*—I am very glad to have been able to see this in the living state. An examination of the plant noticed by Mr. Warren in Kensington Gardens (see p. 238) shows all the characters pointed out by Beneken in his paper (Bot. Zeitung, 1845, 725), as distinguishing it from his *B. serotinus*, which is the usual English "*asper*" —or rather, if we are to use the oldest name, *B. ramosus*, Huds., as I have shown in Journ. Bot. VIII. 376. The aspect of the Kensington Gardens plant when growing is more distinct than the characters would have led one to expect; the slender nodding panicle and small hoary spikelets scarcely at first suggest *B. ramosus* (*asper*) at all. There are always more than two branches in the lowest semi-verticil of the panicle, and these are shorter than in the ordinary plant, and not divaricate at a right angle with the main axis, but ascending, forming an acute angle with it; the upper part of the panicle is drawn out and very pendulous, with several short-stalked single spikelets arranged on it. The spikelets themselves are not more than an inch long, containing from 5 to 8 flowers. The glumes are much less unequal than in the usual plant. Good characters are presented by the upper glume, which has its lateral ribs strongly hairy, and by the lower pales, which are uniformly hairy (to which the grey appearance of the spikelet is due), and not longer than their awns. The anthers are orange. The leaves, especially the lower ones, are considerably more hairy, and somewhat narrower than in usual *B. ramosus*, Huds, whilst the sheath of the uppermost leaf is almost glabrous. Though some of these characters are occasionally found in the common plant, the coexistence of all is sufficiently characteristic. Besides these points, the plant certainly flowers earlier than its commoner ally, the Kensington Gardens specimens, which grow in damp shady ground, were past flowering on August 4th (and the process of drying has since broken up the spikelets into separate flowers), whilst *B. serotinus*, of which I saw plenty on the next day in the sunny hedgerows of Hillingdon, was just in flower. The plant would be worth cultivation, with a view of testing the permanency of these characters. As for the locality, it seems most likely that the grass has been introduced into the Gardens, perhaps from abroad: *Apera Spica-venti* grows in the same enclosure. However that may be, it is one of the most interesting plants in Mr. Warren's remarkable list, to which, by the way, I can add *Impatiens parviflora* and *Bromus sterilis*, the former in Hyde Park, the latter in Kensington Gardens.—HENRY TRIMEN.

SUFFOLK PLANTS.—I gathered several rare and interesting plants last month in the neighbourhood of Mildenhall and Cavenham, and there are two of them to which I wish now specially to call attention. The one is a ciliated form of *Polygala depressa*, which I gathered on a grassy bank by the side of boggy ground near Lachford Bridge. There was plenty of the ordinary *P. depressa* on the peaty ground below; but every plant which I examined from the bank, which was of a sandy soil, had the outer sepals strongly ciliated. Mr. Watson, on p. 488 of his Comp. of Cyb. Br., mentions the probability of its occurring, but I have not heard for certain if it has been noticed before. The other plant is the *Alsine laxa*, Jord. (variety of *Alsine tenuifolia*), I found it abundantly in the neighbourhood of Icklingham, Mildenhall, and Herringswell. It differs chiefly from *A. tenuifolia* proper, by the longer capsule, and also by having a few glandular hairs on the calyx.—J. F. DUTHIE.

JUNCUS SUPINUS, var. KOCHII, *Syme*, *E. B.; J.* NIGRITELLUS, *Koch, non D. Don*).—I gathered a few specimens of this plant on a single spot near Highbeech, Essex, on the 2nd of August. Its characters clearly correspond with the description given in E. B. under var. γ, viz. stamens 6; filaments twice as long as the anthers; capsule impressed at the apex. I have carefully searched other parts of Epping Forest, but I have not as yet succeeded in finding another locality for it. Considering, however, what a very variable plant *J. supinus* is, this variety has probably been often overlooked.—J. F. DUTHIE.

MIDDLESEX PLANTS.—A specimen of *Barbarea stricta*, Fr., communicated to me by Mr. Baker, enables me to identify with it a plant in my herbarium, collected at Chase Bridge, between Twickenham and Hounslow. The large terminal and almost evanescent lateral segments of the leaves are a striking character. Dr. Boswell Syme appears to be in error in describing the colour of the flowers as paler than in *B. vulgaris*. Mr. Baker correctly describes it as orange-yellow and deeper. The localities given in the 'Flora of Middlesex' for *Lathyrus Nissolia*, L., are almost all somewhat antiquated; Mr. A. W. Bennett, however, informs me that he has seen lately numerous specimens from the neighbourhood of Mill Hill.—W. THISELTON DYER.

There is in the Kew herbarium a specimen of *Herniaria glabra*, L., from Dr. Burchell's herbarium, to which the following label is attached:—"*Herniaria glabra*, Fl. B. Ex horto proprio, evenit ex humo ab Ealing Common, 21.6.17."—JAMES BRITTEN.

I found the plant I now send—*Bupleurum rotundifolium*—in the allotment ground between Hanwell and Ealing. It is very luxuriant.—E. C. WHITE.

Trigonella ornithopodioides, De Cand.—I found this species, ten or twelve plants, by the wayside near the thirteenth milestone on the Uxbridge road; nearly opposite Hillingdon Place Lodge, in Middlesex. I see by the 'Flora of Middlesex' (p. 78) that it has not been recorded in the county since about 1805, and is bracketed as "very probably or certainly extinct."—J. L. WARREN.

Mr. Warren kindly accompanied me to the spot above mentioned. The *Trigonella* grows in company with *T. minus* and abundance of typical *Sagina ciliata* along the roadside. In the immediate neighbourhood (in District I. of 'Flora of Middlesex') Professor Areschoug, of Lund, who was with us, noticed the following *Rubi*:—*R. Lindleianus*, Nees; *R. leu-*

costachys, Sm.; *R. umbrosus*, Bab.; *R. Radula*, Weihe; *R. pallidus*, Weihe; *R Balfourianus*, Blox.; *R. corylifolius*, Sm.; *R. dumetorum*, Blox., and *R. ferox*, Blox. None are additions to the Middlesex list as already given in the Flora by Mr. Warren. *Lepidium ruderale* is an abundant wayside weed for almost the whole distance from West Drayton Railway Station to Hillingdon; especially abundant by the canal bridge. —HENRY TRIMEN.

My friend, Mr. W. A. Tooke, of Pinner Hill, has been diligently studying the botany of the districts between Pinner and the Colne. I have had the pleasure of accompanying him in several of his walks; the result has been the addition of several plants to the flora of the district. It is desirable that a record should be kept of these discoveries, and I therefore send you the following list of some of the plants noticed by us since the publication of the 'Flora of Middlesex.' I append the initials of the observer to each plant. *Helianthemum vulgare*, Gærtn. [New to Middlesex.] On a bank at Pinner Hill, about two yards from the Hertfordshire boundary. "There is a considerable quantity in one patch, but it does not extend far." Aug. 10th, 1871. W. A. T.—*Sagina ciliata*, Fr. Pinner. W. M. H.—*S. nodosa*, E. Meyer. Still growing at Harefield. Aug. 1st, 1871. W. A. T.—*Oxalis Acetosella*, L., var. *subpurpurascens*, De Cand. Occurs at Pinner. W. M. H.—*Genista tinctoria*, L. Pinner Hill, and Woodhall, Pinner. W. M. H.—*Bupleurum rotundifolium*, L. A single plant at Pinner in 1869. W. M. H.—(*Œnanthe Phellandrium*, Lam. Occurs in the Colne at Hamper Mill, Herts, a few miles above the place where it enters Middlesex. It should, therefore, be looked for about Harefield and Uxbridge, W. M. H.)—*Viscum album*, L. Northwood, on Thorns and Apples; Pinner, on an Apple-tree at the Manor House. W. M. H.)—*Mentha Pulegium*, L. ["Extinct," Fl. Midd.] Pond at Pinner Hill. W. M. H.—*Chenopodium Vulvaria*, L. Pinner, plentiful. W. M. H.—*Neottia Nidus-avis*, Rich. Copse in Headstone Lane, Pinner, Mrs. Bourne. This I have not seen. W. M. H.—*Habenaria viridis*, R. Br. [New to Middlesex.] Pinner Hill. June, 1871. W. A. T.—*Juncus diffusus*, Hoppe. [New to Middlesex.] Porridge-pot Hill, Pinner. Aug. 8th, 1871. W. M. H.—*Polypogon monspeliensis*, Desf. Pool at Woodridings, Pinner. Aug. 8th, 1871. W. M. H.—*Cystopteris fragilis*, Bernh. [New to Middlesex.] Pinner. The exact locality is, for evident reasons, withheld. W. M. H.—The plant noted in 'Flora of Middlesex' (p. 273) as *Epipactis palustris*, Sw., was found again in Pinner Wood last year, 1870, but I had not an opportunity of seeing it. Two plants have been found this year in Nanscot Wood, about thirty yards beyond the Middlesex boundary, which are probably *E. purpurata*, Sm. I should have certainly marked them so, were it not that the fully-blown flowers are patent and not connivent, and the upper bracts are shorter than the flowers. The lip is very faintly crenate, but not sufficiently so nor sufficiently large to assure me that it is *E. palustris*. The germens of the flowers are glandular, not downy. A plant with very large roundish leaves, nearly obovato-spathulate, has been found in Pinner Wood by Mr. W. A. Tooke (not in flower), which I think will prove to be *Epipactis latifolia*, All. Should it reappear next year, we may settle this point. An *Epipactis*, either *latifolia* or *media*, has been found in copse at Headstone, Pinner, by Mr. Bourne.—W. M. HIND.

ANOTHER NEW BRITISH ÆCIDIUM.—Reading the account of *A. statices*, Desm. (p. 244), reminds me that *A. Cydoniæ*, Lenormand, occurred in some plenty on the leaves of several Quince-trees in Mr. Alfred Smee's garden at Wallington this spring.—W. G. SMITH.

SISYRINCHIUM BERMUDIANA, *L.*—The British Isles are not the only habitat for this plant in the Old World. In the Kew herbarium there are numerous specimens collected in elevated situations in the island of Mauritius by Telfair, Bouton, and Ayres. It has also been recently sent to Kew from Australia (probably Queensland).—W. T. THISELTON DYER.

FUNGI IN SHROPSHIRE.—The woods in this county have been unusually prolific in Fungi during the late rains, many of the common species being almost unrecognizable from their remarkable development in size and brilliancy of colour. Amongst the rarer species found I may name *Hydnotria Tulasnei*, B. and Br., which I found in the Wrekin Wood, and which was kindly determined for me by C. E. Broome, Esq. It measured 3½ inches in circumference, but was not mature. On searching the same spot some time later in the month (July), I was unsuccessful in finding another specimen. I also found *Strobilomyces strobilaceus*, Berk., in Whitcliff Wood, near Ludlow. This is a very remarkable Fungus, from its resemblance to the cone of the Scotch Fir, and the peculiar red tinge which the flesh assumes when it is cut or bruised. It is well figured on a reduced scale in Mr. Cooke's excellent 'Handbook of British Fungi.' In the same wood occurred several specimens of *Hydnum zonatum*, Batsch, which presented the varying sheen in the spines exhibited by shot-silk, a peculiarity observed by Messrs. Berkeley and Broome in specimens found at Ascot in 1865.—W. PHILLIPS.

ALTHÆA HIRSUTA, *L.*—Mr. T. Fowell-Buxton writes to the 'Field' that this species has been found in a disused brickfield in the parish of Stanstead Abbott, Ware, Hertfordshire. It occurred, I am informed, with *Alyssum incanum*, *Saponaria Vaccaria*, and other casuals.—H. TRIMEN.

ROSA GALLICA IN SURREY.—I am indebted to Mr. Wilson Saunders for fine specimens of *Rosa gallica*, gathered near Charlwood, in Surrey, with the following note upon the conditions under which it occurs:—"Where it grows it is as wild as *Rosa canina*, *R. arvensis*, and *R. micrantha*, all found in the same broad copse-like hedge so frequent in some parts of Surrey and Sussex. It grows on the west side of this hedge, facing a cornfield, through which there is no footpath. There are two patches of the Rose, one about two or three yards in length, and containing only a few plants; the other many yards in length, and containing a considerable number of plants. The Rose is of an upright growth, rising two to three feet among long grass and other herbage, etc., and fruiting freely. The cornfield alluded to is situate about intermediate between two farms, which are nearly half a mile apart, and no buildings nearer. After diligent research, I cannot find the Rose in any other locality about Charlwood, either wild or in the gardens of the farms or cottages. It is a complete puzzle to me the locality of this Rose. I cannot conceive it to be originally wild there, but how it could get so *thoroughly* naturalized where it is is equally difficult to understand. It must, I think, have been very many years where it is." The specimens, a supply of which Mr. Saunders has kindly dried for distribution through the Exchange Club, are just like those of ordinary wild Continental *gallica*, quite unmodified by cultivation.—J. G. Baker.

Cybele (p. 244).—My communication (p. 78) on the pronunciation of this word contained a suggestion (Cybēbe) and remarks almost identical with the first four lines of the paragraph on page 244, but by some oversight the passage was expunged in passing through the press. The suggestion is not a novel one. Whether it has the sanction of MS. authority I cannot offhand say, nor is this Journal perhaps the fit place for a discussion of the question, or of the merits of Professor Dyer's last suggestion.—R. Tucker.

Extracts and Abstracts.

ABSTRACT OF RESEARCHES ON THE ANATOMY OF BUD-SCALES.

By F. W. C. Areschoug.

(*Translated by* W. T. Thiselton Dyer, B.A., B.Sc.)

In a paper on the structure of the leaf (*Acta Universitatis Lundensis*, 1867) I have endeavoured to show that the leaf is a flattened stem.* The limb consists principally of cortex, of which the external tissue, modified, in the case of leaves exposed to air, into a parenchyma composed of cells resembling the stakes of a palisade,† is developed more especially on the *upper* side of the leaf, while the inner layer of the cortex, converted into a spongy parenchyma, forms its *lower* region. In the bud-scales the cellular tissues of the stem appear almost unchanged, and the difference of structure between the outer and inner sides of the scale is not so considerable as that which exists in leaves exposed to the air. The cortical tissues forming the greater part of the bud-scale resemble those of the stem, the outer layer being found, in the bud-scale, on both sides, and entirely enclosing the inner layer. The external layer, however, is more marked on the external side of the scale, probably because it appears there as a protective tissue; while this layer, modified in true leaves into palisade-parenchyma, occurs wholly, or at any rate for the most part, on the upper side, corresponding to the inner in the bud-scale.

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* Casimir De Candolle has developed a theory in some respects analogous to this. According to his view, founded on the half-circular arrangement of the fibro-vascular bundles as seen in a cross-section, the leaf is a branch with its posterior half atrophied. ('Archives des Sciences,' May, 1868. Student, Aug. 1868.)

† Palisade-like parenchyma," of some German authors.—See Duchartre, Éléments de Bot. p. 330.

A peculiarity, which has nothing corresponding to it in leaves properly so called, is the anatomical difference which exists most frequently between the inferior and protected part of the bud-scales and their upper and naked portion. The external scales being wholly naked, it is only at their lowest portion, where they are attached to the stem of the bud, that they present any difference from the upper portion; in all the other scales this distinction exhibits itself throughout the whole *protected portion.* Speaking generally, the cellular tissues of these portions resemble those which compose the stem in its earliest state in the bud; they are more tender, and have their walls thinner than in the upper portion. Even when the internal structure of the bud-scales is only composed of a kind of liber, with vascular bundles, as in the Beech, this holds true, at least as to the delicacy and thinness of the cell-walls. In other respects, the differences may involve either the colour of the cell walls, and even the cell contents, or the structure of the cellular tissues. In these two cases the modifications go on augmenting from the base of the bud-scale to the apex, and they are more manifest on the outer side than on the inner. The difference of colour depends ordinarily on the changes which the cell contents undergo: the lower part of the scale contains cells with colourless cell walls, and cell contents frequently containing chlorophyll, but often colourless and muddy-looking; but in the upper part these are transformed into a sap often brilliantly coloured (*Tilia*, *Salix*), or into a brown and resinous substance, which infiltrates and tinges the cell-walls either of the epidermis alone or of the rest of the cellular tissue as well (*Rhamnus alpina*, L.).

In so far as the difference between the upper and lower part of the scales depends on the cellular tissues, the former may consist of cork or bast fibres, while the latter resembles more the stem within the bud. However, the different structure of the bud-scales at different heights does not always correspond to the cellular tissues of the stem and that of the lower part of the scale; frequently the cellular tissue of this, as, for example, in many conifers, consists of a layer of cork (*Abies excelsa*, De Cand.), or is even transformed, for the most part, into a viscous matter (*Ulmus montana*, Sm.). On the other hand, there are bud-scales (*Æsculus*, *Fraxinus*) where there is no noticeable difference between the two portions, and this is especially the case with those in which the cellular tissue contains chlorophyll, and the function of warmth-retaining seems to belong to the epidermis.

The variety in the inner structure of the bud-scales depends upon the fact that it is sometimes one, and sometimes another, of the cellular tissues of the stem which forms the principal portion.

It is only the tissues, however, existing outside the cambium of the stem which contribute, in a considerable extent, to the formation of bud-scales; the cambium and the vascular bundles, although they are never wholly deficient, are always little developed. In fixing our attention on the exterior bud-scales, and on the upper and naked portions of the inner bud-scales, we shall find that their principal portion may consist of the following cellular tissues:—

1. *Bast.*—It is only the bud-scales of *Fagus sylvatica*, L., that consist wholly of bast; in other cases bast bundles are found, in addition to

cortex proper, in the bud-scales of *F. Cunninghamii*, Hook.; of *Quercus pedunculata*, Ehrh.; *Carpinus Betulus*, L.; *Populus alba*, L.; *P. hybrida*, Bieb.; *P. tremula*, L., and *P. tremuloides*, Michx.

2. *Interior cortical layer.*—The two layers of cortex are easily distinguishable; the inner may sometimes form the predominant layer in the bud-scales, as in *Rhamnus alpina*, L., *Tilia parvifolia*, Ehrh. In this last tree this tissue is especially remarkable for the presence of large cavities filled with a viscous matter.* In *Populus dilatata*, Ait., *P. balsamifera*, L., *P. angulata*, Ait., *P. candicans*, Ait., *P. Canadensis*, Desf., and *P. nigra*, L., which have the two cortical layers scarcely distinct the one from the other, it is the inner layer, which in the bud-scales predominates over the outer one.

3. *Outer cortical layer.*—This cellular tissue predominates in the bud-scales of *Acer platanoides*, L., and the different species of *Salix*,—*S. lanata*, L., for example. When no difference exists between the two layers of the cortex, as in *Æsculus Hippocastanum*, L., and *Fraxinus excelsior*, L., the entire parenchyma of the bud-scales seems to correspond to the external cortical layer.

4. *Cork.*—The whole of the upper and naked portion of the bud-scales of *Ulmus montana*, Sm., consists, for the most part, of this tissue; in their lower portion the cortex is the predominant element, and its inner tissue decomposes, in great measure, into a viscous fluid. *Corylus Avellana*, L., resembles the Elm in the consistence of its bud-scales.

5. *Epidermis.*—The middle scales of *Abies excelsa*, De Cand., as well as of other conifers, consist for the most part of an epidermis, of which the external wall is considerably thickened.

[It may be useful to give the morphological equivalents of some of the bud-scales, of which the minute anatomy has been described by Areschoug.

Stipules.—It is rather remarkable that, inasmuch as these organs are found to vary considerably in different Natural Orders, so as to afford available distinctive characters, they should take the form in the majority of our forest trees of protective scales. This is the case in the Lime (*Tiliaceæ*); Vine (*Ampelideæ*); Fig (*Urticaceæ*); Elm (*Ulmaceæ*); Chestnut, Oak, Hazel, Beech (*Cupuliferæ*); Willow, Poplar (*Salicaceæ*).

Stipules and petiole combined.—Rose.

Petioles.—Gooseberry, Ash, Horse-chestnut, Walnut.

Blade.—Lilac, Maples (*Vaccinium Myrtillus*), L., *Coniferæ*.

An elaborate paper on the naked-eye anatomy of Bud-scales, by Loefling, will be found in the 'Amœnitates Academicæ,' vol. ii.; see also 'Malpighii Opera Omnia,' tom. i. pl. x.–xiii.—W. T. D.]

Proceedings of Societies.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—EDINBURGH, 1871.

The following communications bearing upon botany were read:—

Section C. Geology.—Professor Williamson, "On the Structure of

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* The more external cells are represented as containing sphæraphides (fig. 31).

Dictyoxylon." This genus—established by the author on stems exhibiting structure from the coal-measures—was described as consisting of a central vascular axis, with radiating vascular plates, separated by medullary rays, and surrounded by a parenchymatous layer containing free vascular bundles like those of the centre, and the whole enclosed in a bark composed of elongated cells, some of which were thickened by secondary deposits, and arranged in somewhat regular lozenge-shaped meshes, giving to the exterior of the stem a Lepidodendroid aspect. Five species were described.——Mr. Carruthers criticized the descriptions of the author, and maintained that the stems, though exhibiting certain unimportant variations, could be correlated with the stems of some existing *Lycopodiaceæ.*——W. Carruthers, "On the Vegetable contents of Masses of Limestone occurring in Trappean Rocks in Fifeshire, and the conditions under which they were preserved." The fragments of limestone had been observed on the shore and traced to their place in the rocks by Mr. Grieve. They occurred, of different sizes, in a coarse amygdaloidal trap-rock, and the author believed that they were fragments of a peaty layer forming on the surface of the land at the time the volcanic matter was thrown up, and that this layer was broken up, and its fragments, along with masses of clay, sandstone, etc., were enclosed in the volcanic materials when they were arranged under water. The large amount of lime contained in the trap seized on the peat and converted it into limestone before it had time to decay. The plants were those peculiar to the Carboniferous period.——Professor Williamson believed that the limestone was formed where it was found, and occurred in distinct layers between igneous rocks. The great difference in the hardness of the substance was due to the influence of the burning rock.——Mr. Pengelly, in his Report on Kent's Cavern, stated that he had obtained impressions of Ferns in the stalagmite of the Cave, which Mr. Carruthers had determined to be luxuriant specimens of *Pteris aquilina.*

SECTION D. BIOLOGY. DEPARTMENT OF ZOOLOGY AND BOTANY.—*August 4th.*—Professor Wyville Thomson, F.R.S., presided. Rev. Thomas Brown, F.R.S.E., "On Fossil Wood from the Base of the Lower Carboniferous Rocks at Langton, Berwickshire." The author had obtained from the lower carboniferous rocks of this locality some specimens of fossil wood which seemed to possess certain peculiarities of structure deserving of notice. The transverse section showed a central pith with numerous rays going off towards the circumference, and the appearance of annual rings of growth. The longitudinal section showed it to consist of scalariform tissue, and what appeared to be rays were found to be vascular bundles. The author stated at some length the reasons which led him to think that the dark circles were really analogous to the annual rings of living exogenous trees. He referred also to the combination of cryptogamic characters with those of exogenous structure. Mr. Carruthers considered that this belonged to a Lepidodendroid plant, which had been described by Cotta as *Diploxylon.* The appearance of annual rings he considered deceptive, being due to alterations in the specimens during fossilization.——Professor Thiselton Dyer, B.A., B.Sc., "On the So-called 'Mimicry' in Plants." He said, in all large natural families of plants there is a more or less distinctly observable general habit or *facies*, easily recognizable by the practised botanist, but not always as easily to be expressed in words. The existence of such a general habit in leguminous and composite plants is familiar to every one. What have been hitherto spoken of as *mimetic* plants are simply cases where a plant belonging to one family puts on the habit characteristic of another. This is entirely different from mimicry among animals, inasmuch as the resembling plants are hardly ever found with those they resemble, but more usually in widely different regions. *Mutisia speciosa*, from Western South America, a Composite, has a scandent leguminous habit, and closely agrees in its foliage with *Lathyrus maritimus* of the European shores (although that plant is not strictly speaking scandent). In the same way three different genera of Ferns have species (found in distant parts of the world) indistinguishable in a barren state. The term Mimicry seems objectionable in these cases, and I propose Pseudomorphism as a substitute. As to the cause of the phenomenon, I can only suggest that the influence of similar external circumstances moulds plants into the similar form most advantageous to them. An illustration is afforded by the closely resembling bud scales which are found in widely separated Natural Orders of deciduous trees as modifications of stipules. I do not, however, think that the moulding influence need always be the same. I believe that different external conditions may produce the same result; in this respect they may be called analogous. For example, several identical plants are found on the seashore, and also on mountains. The reason is, I believe, that they are equally able to tolerate the effect of soda salts and also of mountain climate; the tolerance of either unfavourable condition gives them the advantage over less elastically constituted plants, and the two are therefore analogous in their effect. ——Professor Dickson remarked that instances of so-called mimicry were by no means uncommon amongst plants. Comparing *Euphorbiaceæ* with *Cactaceæ* and *Stapelia*, it was often practically impossible to distinguish them without seeing their flowers. In these cases similar physical conditions appear to have produced the similarity.——Mr. Carruthers said that though not wholly agreeing with the views of Professor Thiselton Dyer, some facts occurred to his mind which rather sustained those views. The vegetation which bordered fresh-water streams throughout the world all conformed, more or less, in certain characteristics of foliage to the willow type; this was true even of Australian Myrtaceous plants. With regard to *Mutisia*, he might say that he believed that from the suborder of which it was the type alone, the habit of almost all the principal Orders of flowering plants might be represented. He fully bore out the statements as to Ferns, and he pointed out that the whole subject constituted one of the special difficulties of fossil botany.——Professor Balfour could confirm the remarks of the last speaker as to the important bearing of this subject upon fossil botany. The speculations as to the effect of maritime conditions upon plants were particularly interesting. It was by no means easy to give a satisfactory explanation of the occurrence of strand plants upon mountains. *Plantago maritima* might be added to those already mentioned. *Armeria maritima* did not occur at the highest elevations. He had induced Professor Voelcker to analyse the ashes of this plant from its most inland situation in Scotland, Ben MacDhui. They contained less soda and more potash than strand plants, and no iodine, which was present in the latter.——Professor E. P. Wright admitted the importance of the distinction which had been laid down. He supposed, however, that it would not be contended that such a thing as true mimicry might not exist amongst plants.——Mr. R. Trimen said that it had occurred to him that it might be an advantage to a plant to adopt the habit of one which was poisonous, and so be passed over by herbivorous animals. The instances which had been adduced related to the vegetative organs alone. He remembered a case mentioned by Harvey,* where two South African plants growing intermingled could only be distinguished by careful inspection.—— Professor Lawson thought that it was not wholly true that mimicking plants were separated in their habitats. He had been struck with this in seeeing *Villarsia nymphoides* and *Nymphæa alba* growing together. —— Dr. Lankester considered that in Darwin's theory of natural selection would be found the ultimate solution of these strange resemblances. The influence of the mineral food of plants was a very important consideration in their growth. ——Professor Thiselton Dyer in reply said that though he had not pretended to do more than indicate the direction in which he thought a solution of these problems might eventually be obtained, yet he considered that the tone of the discussion supported him in his views. He was quite prepared to allow that real protective resemblance might occur amongst plants. Plants certainly grew together which resembled one another very closely in their foliage. The excessively rare *Menziesia cærulea* had been protected, at any rate, from the rapaciousness of botanists by the more plentiful *Empetrum nigrum* on the Sow of Athol being mistaken for it.——Dr. Murie, "On the Development of Fungi within the Thorax of Living Birds." The low forms of vegetable life described did not present any characters in the drawings by means of which it could be determined with any certainty as to whether they were an imperfect condition of a Mucedine or an Alga. They consisted of slender filaments, mixed with small elliptical spore-like bodies; the whole collected together into a pale greenish spot.——Mr. Cooke and Professor Perceval Wright were of opinion that they were rather of an algoid than a fungal character. ——Dr. Bastian made some observations on the development of organisms in closed cavities as conclusive arguments for the truth of the so-called spontaneous generation theory.

August 5.—There was no meeting, but an excursion was made, under Professor Balfour to Linlithgow. The party followed the banks of the Avon. The woods contain a good many naturalized plants, such as *Geranium phæum*, *Symphytum tuberosum*, *Dianthus barbatus*. *Lysimachia thyrsiflora* was met with near the canal. *Campanula latifolia*, *Myrrhis odorata*, *Neottia Nidus-avis*, and *Epipactis latifolia* were collected.

August 7.—Professor Wyville Thomson, F.R.S., presided. Mr. A. G. More, F.L.S., called the attention of the meeting to some fine living specimens of *Spiranthes gemmipara*, Lindl., or *S. Romanzoviana*, Cham., as it had lately been renamed. The plant had been collected by himself during an excursion lately made to Berehaven, the only European locality where this Orchid is known to occur, and the specimens, though obtained now three weeks ago, still exhaled the delicious and delicate perfume which is characteristic of the Irish Ladies'-tresses.——Mr. A. G. More, F.L.S., also made some remarks on *Eriophorum alpinum*, L., observing that his friend and colleague Dr. Moore, had, he believed, been imposed upon when he announced it as an Irish plant (see Journ. of Bot. V.

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* *Sarcocyphula Gerrardi* and *Sarcostemma viminale*, both asclepiads, which grow intertwined, and can only be told by examination of their flowers (see 'Thesaurus Capensis,' ii. p. 58).

p. 46). Mr. More had himself visited the alleged locality, near Millstreet, and, after a search of many hours on the borders of the lake, satisfied himself that there is no trace of *E. alpinum* in that locality. Dr. Moore had also, during another season, taken great pains in searching for the plant, but did not succeed in finding it, and the authors of the 'Cybele Hibernica' now both believe either that *Scirpus cæspitosus*, whose spikes are often slightly woolly with the growth of the bristles, were mistaken for it, or that some mistake was made in transmitting the specimens sent from Cork by Mr. Sullivan, which, though seemingly very old and battered, belong to the right species. With regard to the second supposed Scottish locality of *E. alpinum*, he had the authority of his friend Dr. Balfour to say that he had always felt some slight doubt about the single specimen found in his herbarium, and this doubt was much increased on his recognizing the absolute identity of the single specimen with others certainly collected in Forfar, and which are glued to the same sheet in the University Herbarium. Hence the plant must for the present be erased from the British as well as the Irish Flora.——Professor Balfour, after thanking Mr. More for his communication, and for the presentation of the plants of *Neottia* to the Botanic Gardens, stated that the specimen of *Eriophorum alpinum*, from the University Herbarium, was among dried specimens of *Scirpus cæspitosus*, collected by him at Durness, in Sutherlandshire, on 21st August, 1827, during the first botanical excursion which he took with Dr. Graham, when a junior student of the class of botany. The plant was glued down with specimens of *S. cæspitosus*, and the name and date were put down on the label accompanying them. The plant was not detected as being *Eriophorum alpinum* till many years afterwards. There can be no doubt that the plant was among the specimens of the Sutherland *Scirpus cæspitosus*; if not collected at the same time as these, it is not easy to account for its appearance there. Professor Balfour never collected *Eriophorum alpinum*, at Restennet, and the only specimens in his herbarium were presented to him by Sir W. Hooker in 1837 and 1838. These specimens, being very precious, were glued down at once in Professor Balfour's herbarium, and there were no duplicates. If, as Mr. More thinks, the specimen has been accidentally placed among the *Scirpus cæspitosus*, it is not easy to conjecture how this has taken place, for duplicates of *Eriophorum alpinum* are certainly not easily procured. However, the only way in which the matter could be settled would be by undertaking a visit to Durness, and endeavouring to find the plant again. ——Professor Babington hoped that the retired locality of the *Spiranthes* would preserve it from extirpation. It was a most interesting plant; it was at first identified with an American species by Sir W. Hooker, a view in which he himself at one time agreed, but as to which he was not now certain, in fact it was probably uncertain. Latterly Professor Reichenbach had identified it with the Kamtchatkan *Romanzoviana*, but of the propriety of this he had doubts. *Eriophorum alpinum* was certainly an unfortunate affair; an imposition had been attempted upon Dr. Moore. A similar thing happened at the British Association at Cork. The Irish locality must certainly be given up. The Scotch plant was a more difficult matter; a label had, however, been probably misplaced. He himself did not think that it grew in N. Sutherlandshire, though inasmuch as the plant was a native of N. Europe, this was not an unlikely locality. Between imposition and extirpation the plant had ceased to possess a claim to a place in the British Flora.——Mr. Gwyn Jeffreys remarked on the injury to science from the rapacity of collectors.——Professor Balfour thought this was overrated. Plants were not easily extirpated by botanists. The Clova rarities showed no signs of diminution.——Professor Balfour exhibited *Juncus effusus* with both spirally-twisted and spirally-curled leaves. It had been sent from Belfast by Mr. David Bishop, and propagated (by division) in Edinburgh Botanic Garden.——Professor Thiselton Dyer mentioned the effect of spiral twisting, in *Galium* and *Dipsacus*, in converting a verticillate into a spiral arrangement of leaves. This must be distinguished from the conversion of a verticil into a spiral by mere elongation of the internodes, in which case there is no twisting of the axis.——W. A. Lewis, "A Proposal for a Modification of the strict Law of Priority in Zoological Nomenclature in certain cases." This paper gave rise to a discussion on the whole subject of priority. There was a strong feeling amongst the botanists and entomologists present to condemn bibliographical resurrectionists of obsolete names.——Professor Babington thought a name in use in foreign books should be adopted to the sacrifice of our own, if really possessed of a prior claim. He allowed, however, that there was a raking up which was very objectionable. There was, it was true, an undoubted right to upset a generally received name by one found in an obscure memoir or inaugural dissertation, but it was a right which should remain in abeyance. It was justifiable to correct a name which turned out to be wrongly applied; this was a proper recognition of the penetration and correctness of an overlooked writer. As a mere result of obscure bibliography, the resurrection of obsolete names was a system which should be put a stop to.——Professor Thiselton Dyer advocated common-sense as a useful principle in the matter. It would be absurd to upset the name of *Polygonum Persicaria* because applied to another species in the Linnæan Herbarium. Too much attention should not be paid to the practice of French writers; they were notoriously perverse in such matters, witness their maintaining the sole breach of uniformity in the nomenclature of the chemical elements, in calling nitrogen azote, in opposition to the practice of every other country.——Canon Tristram thought common-sense a dubious principle. Other speakers addressed the section from the zoological stand-point. ——Mr. J. Sadler, "On the Species of *Grimmia* (including *Schistidium*) as represented in the neighbourhood of Edinburgh." The principal distinction separating *Schistidium* from *Grimmia* rests on the arbitrary character of the adhesion or partial adhesion of the columella to the lid, and should be neglected. In Greville's 'Flora Edinensis' (1824), six species are described as occurring within ten miles of Edinburgh. In Balfour and Sadler's 'Flora of Edinburgh' (1863), ten species are enumerated; in the second edition (1871) this is increased to fifteen. Ten of these occur upon Arthur's Seat. With the exception of *G. trichophylla* they are found to prefer the amygdaloidal trap, and very rarely occur on the basalt in a very stunted and starved condition. At one part of the hill, where the upper drive cuts the rocks to the back of the basaltic columns of Samson's Ribs, there is an area of very limited extent where the whole ten species can be collected in a few minutes. The paper concluded with notes on the arrangement and distribution of the Edinburgh species. *G. conferta*, Funk, is abundant on Arthur's Seat in some places. Although not noticed in any list of Greenland plants, it occurred on pieces of lava brought from Greenland as ballast, and used in the Botanic Garden for rockwork. *G. pruinosa*, Wils. ms., was detected in Dr. Greville's herbarium. It was collected in 1847 in the King's Park, Edinburgh (see Journ. Bot. VIII. 205). *G. anodon*, B. and Sch., was first discovered in Britain by Mr. W. Bell, on Arthur's Seat, in 1869. *G. orbicularis*, B. and Sch., was first detected in Britain by Mr. Sadler, on Arthur's Seat, in the same year.——J. Birkbeck Nevins, "On the Changes which occur in Plants during the Ripening of Seeds." This paper consisted of a number of unconnected remarks on changes in the direction of the pedicel after the expansion of the flower. In *Digitalis* and other *Scrophularineæ* the seed-vessel becomes erect, otherwise the seeds would fall out before they are ripe; *Limosella* is an obviously explicable exception. In plants such as *Caryophyllaceæ* and *Ranunculaceæ*, which flower during summer, the pedicel is usually erect. In *Helleborus* it is drooping after flowering, the persistent floral envelopes protecting the fruit. The same thing is observable in many autumnal flowering plants, such as *Tagetes*, where the involucre in the drooping inflorescence roofs over, as it were, the fruits. The author concluded by propounding his views as to the morphology of Cruciferous fruit. The replum and placentas he regarded as a continuation of the axis bearing two terminal leaves, which, becoming reflexed, adhere to the axis, and are, in fact, the valves of the capsule; when the capsule ripens the adhesion relaxes, and the leaves uncoil.——Professor Wyville Thomson remarked that the facts detailed in the paper were familiar enough as a matter of description, but were interesting in a teleological point of view. He doubted whether the explanation of the fruit in *Cruciferæ* would find much acceptance amongst botanists.——Professor Thiselton Dyer, "On the Minute Anatomy of the Stem of the Screw-pine (*Pandanus utilis*)." Except that the tissues are less indurated, the general structure of the stem and the arrangement of the fibro-vascular bundles resembles that met with in Palms. The bundles, however, are somewhat remarkable, from containing vessels which belong to the scalariform type. In a transverse section these bundles are seen to become smaller towards the circumference and more condensed, forming a well-defined boundary to the narrow cortical portion of the stem. The bundles are, however, continued through the cortical portion, but are reduced to little more than a thread of prosenchyma. In the cortex there are numerous large cells, containing raphides; these also occur in the rest of the stem, but are less frequent. Crystals of another kind are found in connection with the fibro-vascular bundles. These are contained each in a squarish-shaped cell, forming part of a string or chain. A number of these strings are distributed round the circumference of each fibro-vascular bundle; they are especially abundant in its cortical continuation, as they do not suffer a degradation proportionate to that of the other constituent tissues. This peculiar arrangement of crystal-bearing cells seems probably unique. The crystals are four-sided prisms with pyramidal apices. They are almost certainly composed of calcium oxalate, though they are too minute and isolated with too much difficulty to allow of their satisfactory examination.——Professor Dickson was much struck with the peculiar arrangement of the bundles in the diagram; prosenchyma mixed with vessels was shown both upon their inside and outside. He was doubtful as to Professor Thiselton Dyer's explanation that this arose from the fusion of two bundles back to back. He had himself ascertained the occurrence of extremely large scalariform ducts in *Smilax*. It was evident that geologists should be careful in determining plants from the nature of the vessels.——Professor Wyville Thomson said that the chain-like crystal-bearing tissue would, if it proved characteristic of Screw-pines, be a valuable means of determining the nature of some fossil monocotyledonous stems.——Neil Stewart, "Observations on the Intimate Structure of Spiral Ducts in Plants, and their Relationship to the Flower." It is to be regretted that this paper was permitted to be read. It exhibited a fundamental misconception of the most elementary points in vegetable minute anatomy. A considerable portion of the paper was devoted to the description of "a vascular system" within the epidermal cells of a Rose-petal, "rivalling in complexity the structure of the human eye." [A reference to Carpenter's 'The Microscope,' 4th edition, p. 425, will show what the author really attempted to describe.]

August 8.—Professor Balfour, "On the Cultivation of Ipecacuanha in the Edinburgh Botanic Garden for transmission to India." Besides the plant which had long been in the garden, what was apparently another species had been received from Dr. Gunning. It resembles more than the garden plant the figure of Martius. The leaves were more pointed and less leathery.——Professor W. C. Williamson, "On the Classification of the Vascular Cryptogamia, as affected by recent Discoveries among the Fossil Plants of the Coal-measures." The author thought that justice had never been done to Professor King, of Galway. He did not say that his paper ('Edinburgh New Philosophical Journal,' 1844) was accurate either in details or in its broad features, but thought, nevertheless, that the value of the communication had never been recognized. He wished to insist on the exogenous growth of the woody axis belonging to stems of the Carboniferous Cryptogams. In Calamites, which, though not exactly Equisetaceæ, were their representatives, the central pith was surrounded by a cylinder of wedges resembling those of young Dicotyledons. These wedges sometimes not less than two inches in thickness, and wholly vascular, were a clear proof of exogenous growth. Amongst Lycopodiaceous plants, Adolphe Brongniart distinguished Lepidodendroid and Sigillarian plants. In *Sigillaria* there were two distinct zones, but in *Lepidodendron* there was no such arrangement; these he regarded as *Lycopodiaceæ*, but *Sigillarias* as gymnosperms. However, he (Professor Williamson) was in a position to show that in *Lepidodendron* there is a representative of the second ring. *Lepidodendron*, according to his view, has a vascular pith, surrounded by a true woody zone, from which bundles are given off. The specimen had been carefully figured by Carruthers, though he differed from him in details, especially in asserting the existence of medullary rays. There was a very elaborate cortex, very corky in some plants, very fibrous in others. The *Sigillaria vascularis*, of Binney, includes two forms, one in which the medulla is differentiated into medullary cells, and peripheral vessels ('medullary zone'), and the woody zone exhibits medullary rays. The *Diploxylon* of Corda, has proved that rays do not proceed from the medulla, but from the woody zone. In *Stigmaria* he also maintained that the vascular bundles proceeding from rootlets are derived from the cylinder and not from the medulla. In these plants, as an evolutionist, he looked upon the 'medullary zone' as corresponding to the 'medullary sheath' in recent plants. The consideration of the extinct forms of higher Cryptogams showed him that the term Acrogens must be given up, and led him to propose their division into two groups, correlative with those of Phanerogams. Amongst Cryptogamic Exogens he would include *Equisetaceæ*, *Lycopodiaceæ*, *Isoetaceæ*. The Ferns would constitute the Endogens.—— Mr. Carruthers congratulated Professor Williamson on his acquaintance with Professor King's paper, which he (Mr. Carruthers) had been the means of bringing to his notice. The so-called 'vascular pith,' according to his view, was entirely composed of vessels, some very short; anything like the truncated cellular tissue shown in the diagram was not shown by the specimens. Dr. Hooker had suggested the term 'utricles' for these, as a kind of compromise between vessels and cells. The structure of Fern stems was precisely that of *Stigmaria;* from the vascular cylinder pass off vascular bundles carrying with them a considerable quantity of cellular tissue. In *Hymenophyllum*, however, there was the opposite arrangement, a vascular axis instead of a cylinder; so that, according to Professor Williamson, Ferns would be split up into two groups. The vascular bundles were scattered in some *Lycopodiaceæ*, but in *Lycopodium* they were united into a central axis, and this was precisely the same as in *Lepidodendron.* Classification must be based entirely on the reproductive organs.——Professor Dickson thought the 'vascular pith' was undoubtedly a central axis. He should like to know what distinct evidence there was of the existence of a cambium layer.—— Prof. McNab could not agree with Prof. Williamson in his interpretation of the structure of these stems. Botanists are all agreed in this, that *Lepidodendron* and their allies are closely related to the Lycopods. Now we know that the Lycopods, like the Ferns, have closed fibro-vascular bundles which can only grow for a certain time, and then, all the cambium being converted into permanent tissue, growth must cease. The key to these structures is to be met with in *Lycopodium Chamæcyparissus*, in which we have a cylinder of wood-cells surrounding the central cylinder of united fibro-vascular bundles. This cylinder of wood-cells represents and is a mere modification of the cellular tissue met with in the ordinary stems of Lycopods. In this way it follows that the central portion is not a pith, but consists of the central group of fibro-vascular bundles. It also follows that the wood cylinder in these stems is not the homologue of the wood cylinder of an ordinary exogen. He thought the classification of these plants proposed by Prof. Williamson quite untenable.——Prof. Thiselton Dyer was glad that Prof. Williamson had at last brought his papers to the section where they could be properly discussed. He thought it was a great mistake to dissociate, as was so frequently done, the study of extinct from that of recent forms. The proposed arrangement seemed to him to violate all the canons of natural classification. It was impossible to separate *Equisetaceæ* from Ferns. It was a caricature of evolution to hint any analogy between Prof. Williamson's 'medullary zone' and the medullary sheath.

(*To be continued.*)

BELFAST NATURALISTS' FIELD CLUB.—The third excursion for this season took place on Saturday, July 8th, the locality selected being the Cave Hill Quarries and Deer Park. The sections exposed here are very instructive, ranging through lias, greensand, and chalk, with the usual capping of basalt, which also bursts through the sedimentary rocks in the form of dykes. On the débris of the quarries two rare plants were found, viz. *Lithospermum officinale* and *Orobanche rubra*, the latter on the roots of the wild Thyme (*Thymus Serpyllum*). Those present had a good opportunity of verifying the fact, as the plants were easily dug out of the loose débris and the connection observed. In the Deer Park, not far from the quarries, is the only Irish habitat for the Musk Moschatel (*Adoxa moschatellina*). It grows here in small quantity, and completely hidden under large blocks of stone. It has been known in this station for forty years at least, and is evidently quite wild, there not being a trace of any introduced plants in the Park, save the trees so recently planted. It had been announced that at this excursion the habitat of a rare Fern would be indicated, and a special prize was offered by one of the members for the first specimen discovered, one of the conditions being that none of the plants were to be removed. Accordingly, on leaving the quarries the party were taken higher up the hill, and the field was pointed out in which the Moonwort (*Botrychium Lunaria*) grows very sparingly. This rare little fern only grows to a height of two to four inches, and is usually hidden by the Grass and other larger plants; consequently the contest was a pretty severe test of keenness of sight and powers of observation. In a short time the rain commenced again to pour down in torrents, accompanied with thunder and lightning, so that the search had to be continued under shelter of umbrellas. Ultimately Mr. F. A. Lockwood was declared the winner, and the prize (Seemann's 'British Ferns at One View') was handed to him by the chairman of the day, Rev. George Robinson, A.M. The Adder's-tongue Fern was plentiful in the same field, and also the Yellow-oat Grass (*Trisetum flavescens*). Specimens were also collected here of the Frog Orchis (*Habenaria viridis*) and of the greater Butterfly Orchis (*H. chlorantha*). The party now pursued their course to the summit of the mountain, visiting the well-known MacArt's Fort and the caves. A rare species of Hawkweed, *Hieracium anglicum*, was found plentifully on the cliffs, as also the Red-broom Rape, already noticed. The Filmy Fern (*Hymenophyllum*) is said to have been found on this part of the hill, but time did not allow of any search for it.

CHEMICO-AGRICULTURAL SOCIETY OF ULSTER.—*June* 16*th*.—Thomas Baldwin, Esq., Superintendent of the Agricultural Department of National Education, made an oral communication on "The Culture of Sugar Beet in Ireland." From what he had seen in France, Germany, and Belgium, he believed that in Ireland there were 6,000,000 acres suitable for its growth in the regular rotations so far, at least, as soil was concerned. The beet, however, might contain a large proportion of saccharine matter, and yet not be very profitable for manufacturing purposes; for, if it contained too much saline matter, the saccharine matter would be prevented from crystallizing. He took a great deal of pains to compare the climate of Belgium with that of Ireland. He compared the returns of the rainfall and temperature obtained in Brussels with those of Dublin for ten years, and he found that in the summer season the average temperature of Brussels was about two degrees higher than that of Dublin; while the average winter temperature of Dublin was two degrees higher than that of Brussels. Thus the mean temperature of both was alike. Now the cultivation of the beet in Belgium succeeded admirably, and he was in a position to satisfy them, and hoped to prove conclusively, that so far as climate was concerned, it would succeed in Ireland too, and that the slightest difference of temperature in summer and winter was immaterial, though, of course, temperature was a material element in the growth of any crop. Some persons were of opinion that, in order to a successful cultivation of sugar beet, not only a high degree of temperature was required, but a hot, blazing sun. This was altogether a mistake; in order to induce the secretion of a large quantity of saccharine matter in beet, the root required to be earthed up, and thus shaded from the sun. Sunlight, so far from inducing a large secretion of sugar, was rather inimical to it. After his return from the Continent he grew some specimens of beet, which were analysed in order to ascertain their qualities. Some were grown at Glasnevin and some in county Cork, and he would just say that the specimens grown in Cork, on a light soil, exceeded anything grown in France. In 1870 he grew roots on six different farms in different parts of Ireland, including the Model Farm at Ballymoney, in this county. Dr. Hodges analysed six specimens with the following result:—No. 1 contained 12·19 per cent. of crystallizable saccharine matter; No. 2, 12·33; No. 3, 12·19; No. 4, 12·22; No. 5, 10·63; and No. 6, 9 per cent. Dr. Voelcker analysed a number of specimens grown at the Model Farm in county Cork, on a poor, hungry, gravel soil with the following result:—No. 1 contained 9·91 per cent. crystallizable sugar; No. 2, 10·60 per cent.; and No. 3, 10·98 per cent. Two specimens grown on a light, sandy soil, at the Athy Model Farm, and examined by Dr. Voelcker, were found to contain 10·78 and 10·99 per cent. of crystallizable sugar respectively; while three specimens, grown at the Model Farm, Ballymoney, were found to contain 9·01, 9·37, and 10·52 respectively (see also 'Journal of Botany,' p. 253). The specimens examined by Dr. Hodges were grown at Glasnevin; and though the investigations were conducted by different modes, the results agreed very closely. Now, an important question arose, viz., what was the quantity of crystallizable sugar that would justify the manufacture? Mr. Beauchamp expressed the opinion that when roots contained from 8·50 to 8·75 per cent. of crystallizable sugar, the manufacturer would be justified in extracting the sugar, and Mr. Duncan, who has established a large factory near London, wrote to him to say that anything under 9 per cent. would scarcely justify the manufacture. Now, the very lowest percentage exhibited by the analysis that had been made was 9 per cent., and was equal to the minimum that had been fixed on as justifying the manufacture.

He now came to the question of questions. He thought he had clearly shown that the beet grown in Ireland contained a sufficient percentage of crystallizable sugar to justify manufacture; and the question now was, could the manufacturer give the farmer a price that would remunerate him for the cultivation? He believed he was rather under the mark in stating that farmers might easily raise eighteen tons per acre of clean roots—they could do this without the slightest difficulty. Assuming that for carefully grown roots 20*s*. a ton could be obtained, the farmer would have got £18 per acre for his crop, which, he thought, would pay very fairly. Considerable injury had been done to beet cultivation in Ireland by exaggerated statements about the produce—some putting it down at forty or fifty tons per acre. He would not deal in such statements at all, but would confine himself to what he conceived to be the minimum that it would be possible to realize. Mr. Baldwin then gave the results of some experiments he had made to ascertain the best position in a rotation of crops which the best crop should occupy. He had grown it after mangold wurtzel and Swedish turnips, and the result in both cases was unsatisfactory. He grew it on stubble, the preceding crop having been grass, and he found the very best results. On comparing his notes with Mr. Beauchamp's, he found that the best results were always obtained when the crop was grown on soil intermediate between rich and poor, always assuming it to be deeply and skilfully tilled. The opinion of the best growers of sugar beet on the Continent was that the wheat crop was the best to precede it. His own experience showed that a very large return might be expected after lea oats. He had no doubt, also, that if it was grown after wheat, preceded by potatoes, a capital crop would be the result. The crop should be put in about the beginning and not later than the middle of April; and the drills could hardly be made close enough; for, if the plants were large, the percentage of crystallizable sugar would be small. The roots ought to be about 2½ lb. or 3 lb. each. If the beet crop was put in after lea oats or lea wheat, it would be necessary to use a moderate dressing of farmyard manure—10 to 12 tons per acre of well-rotted dung would be enough. In the experiments he made, when he used as much as 25 tons, the crop was heavy, but the proportion of crystallizable sugar was small. Mr. Baldwin recommended every cultivator to procure seed from seedsmen of undoubted character, or to grow his own seed, and to select those plants which produced the greatest quantity of sugar; thus he would increase the sugar-producing qualities of the plants—an increase which he thought might be indefinitely extended. As to the harvesting, he had no experience of the proper mode of storing the beet for manufacturing purposes. On the Continent, they began to store it when the leaf began to turn yellow, and it was put into sunken pits. Mr. Baldwin stored it precisely the same as mangold wurtzel. In connection with this, he had to mention that the sample analysed by Mr. Beauchamp, and which induced him to say it was splendid, was sent immediately after the roots were lifted. Later in the season, a sample of the same crop was analysed by Dr. Voelcker, and he reported that it only contained between 7 and 8 per cent. of crystallizable sugar; and later again another sample of the same crop was examined, but only 5 per cent. could be found in it. These were samples of the very same crop which were analysed by Mr. Beauchamp immediately after being pulled, and found to contain 12 per cent. This clearly proves the necessity of attending to proper storage. Mr. Baldwin dwelt on the advantage of the beet-root as belonging to a family of crops, which, by promoting tillage, liberated plant food and prepared the ground for other crops. The cultivation of beet-root would cause more land to be brought under tillage, and thus give more employment to the agricultural population, besides furnishing a new source of industry. In Ireland a state of things existed unparalleled in Europe. Half the land was in pasture, one-fourth in waste and water, and only one-fourth in tillage.

Botanical News.

Among new books are to be especially noticed the second volume (completing the work) of M. C. Cooke's 'Handbook of British Fungi' (Macmillan), the second volume of the 'Flora of Tropical Africa,' by Prof. Oliver, Drs. Hooker, Masters, and others, containing the Orders Leguminosæ to Ficoideæ (Reeve and Co.); 'Domestic Botany,' by J. Smith, of Kew (Reeve and Co.); a new edition of Prof. Balfour's 'Flora of Edinburgh' (A. and C. Black); and a German translation of Johnson's 'How Crops Grow.'

Mr. Carruthers, F.R.S., has been appointed consulting botanist to the Royal Agricultural Society,—a new office.

Dr. August Neilreich, a well-known Austrian botanist, died at Vienna on June 1st, at the age of fifty-eight. He possessed an extensive and critical knowledge of the botany of the Austrian empire, and was the author of a 'Flora of Vienna' (1846), a 'Flora of Lower Austria' (1858, with supplements in 1866 and 1869), and very numerous papers in the Viennese scientific journals. His name is preserved in Fenzl's genus of *Compositæ*, *Neilreichia*, and in *Sempervivum Neilreichii*, Schott, and other species.

In the person of Dr. Paul Rohrbach, who died on June 3rd, at Berlin, before the completion of his twenty-fifth year, one of the most promising of the younger botanists of Germany has been lost to science. He had devoted his attention largely to the *Caryophyllaceæ*, and his excellent monograph of the genus *Silene* was noticed in our volume for 1868 (p. 378). He published several useful papers in the 'Linnæa' and 'Botanische Zeitung,' and a monograph of the European species of *Typha* in the last volume of the Brandenburg Transactions. At the time of his premature death he was at work on the *Caryophyllaceæ* and *Typhaceæ* for the 'Flora Brasiliensis.'

We regret to have also to record the death of Dr. Julius Milde, which occurred suddenly, on July 3rd, at Meran, whither he had gone for the benefit of his health. He is perhaps best known by his useful 'Filices Europæ et Atlantidis, Asiæ Minoris et Siberiæ,' published in 1867, and his monograph of all known Equisetums in the 'Nova Acta;' but he wrote very numerous papers on the higher Cryptogams and Mosses in German periodical and transactions, and has contributed a paper on the geographical distribution of the *Equisetaceæ* to this Journal (see Vol. I. p. 32), as well as some shorter notes. His extensive herbaria of European Mosses, of Exotic Ferns, and of Duplicate Mosses are for sale at Messrs. Limpricht, in Breslau.

Professor Henri Lecoq, of Clermont, a man of very varied and extensive knowledge, has also died quite recently, in his seventieth year. He was the author of numerous treatises on physical geography, general botany, horticulture, and geology, and of an elaborate work, in nine volumes, on the Botanical Geography of Central Europe (1854–58), which is too little known in this country. He has left to the town of Clermont his extensive collections of all kinds.

Communications have been received from :—W. Carruthers, J. Sadler, Prof. Thiselton Dyer, Dr. Braithwaite, J. F. Duthie, W. Phillips, W. G. Smith, R. Tucker, J. C. Melvill, etc.

Original Articles.

RECENT ADDITIONS TO OUR MOSS FLORA.—PART IV.

By R. BRAITHWAITE, M.D., F.L.S.

(PLATES CXIX., CXX.)

DICRANACEÆ.

Dicranella Schreberi, β. robusta, Schpr.—*D. lenta*, Wilson, ms.—Resembling a starved condition of *D. squarrosa*, but in the leaf structure entirely according with *D. Schreberi*, with which for the present I retain it. Specimens with perfect fruit are given under n. 74 in Rabenhorst's 'Bryotheca,' the lid being shorter than in the typical form. Found at various places in Cheshire, at Milnthorpe by Mr. Barnes, and near Melrose with young fruit by Mr. Jerdon.

Ditrichum zonatum (Brid.), Lorentz.—*Weissia zonata*, Bridel, Bry. Univ. i. p. 364.—This is the correct synonymy of the plant described as *D. tenue*, *β.* in Journ. Bot. 1870, p. 228, and for the present that species remains a desideratum in our flora. I may add that Mr. Fergusson submitted specimens to the late Dr. Milde, who confirmed the correctness of the diagnosis; the fruit is unknown.

D. flexicaule, *γ. compactum*, Stirton.—*D. Drummondii*, Wils. ms.—In large tufts densely matted with purple radicles; stems shorter, leaves shorter and thicker with denser areolation. Connected with the typical form by the var. *β. densum*, which Mr. Barnes sends from Helsington Barrows, Westmoreland.—HAB. Sides of rills on Ben Lawers (Dr. Stirton, 1866).

TRICHOSTOMACEÆ.

To this family I unite the *Weisiaceæ*, for the two groups approximate so closely in areolation, that it is not possible to draw any well-defined limit between them. We may, however, conveniently form three subfamilies, *Weisieæ*, *Encalypteæ*, *Trichostomeæ*.

Weisieæ.

Anœctangium æstivum, *β. pellucidum*, Wilson, ms. Leaves pale yellowish, scarcely at all crisped when dry.—Near Inverary, growing with the normal form.

Weisia (§ *Hymenostylium*) *commutata*, Mitten, Proc. Linn. Soc. vol. i. Supp. p. 32 (Plate CXIX. f. 1). Dioicous, resembling *W. curvirostris.* Leaves from a sub-oblong base, lanceolate, narrowed, keeled with the nerve, which vanishes below apex, cells nearly all elongated and pellucid; perichætial leaves similar. Fruit like that of *W. curvirostris.* Resembles the figure of *Gymnostomum pallidisetum*, Nees and Hsch. in Bry. Germ., but as Mr. Mitten observes, it cannot be referred to any species whose leaf structure is not described.—HAB. Alpine rocks, Nant-y-Fydd, Wrexham (Mr. Bowman). For the specimen figured I am indebted to my friend Mr. Davies.

W. truncicola, De Notaris, Epilogo della Briol. Ital. p. 598 (Plate

CXIX. f. 2). Dioicous? in large dense tufts, interwoven at base with branched radicles, bright green. Stem innovating dichotomously 1–2 in. high, flexile, reddish, bearing lax radicles at the lower part from the axils of the leaves. Leaves approximated, erect when moist, and often somewhat secund on the young shoots, rather soft, papillose at back, from a narrowly lanceolate base, gradually subulate, channelled, with a thin nerve reaching the apex, the margin not revolute, sharply denticulate above and on the back of the nerve; when dry strongly cirrhate and twisted. Cells at base large cylindraceo-vesicular, the rest small quadrate or subhexagonal, filled with deep green chlorophyll. Growing in expanded tufts like *W. cirrhata*, the leaves resembling those of *W. Bruntoni*, but longer and the margin not revolute.—Hab. On the base of the trunk of an oak in Lower Nuthurst, Sutton Park, Birmingham (J. Bagnall, Aug. 27, 1870). Identical with original specimens gathered by Carestia in the Val d'Intrasca near Verbano.

Trichostomeæ.

As the synonymy of this group has been so carefully worked out by Professor Lindberg in his valuable paper "Om de Europeiska Trichostomeæ" (Oefversigt Kongl. Vetenskaps Akad. Förhandlingar, 1864), I take advantage of it to enumerate all our species, availing myself also of Mr. Mitten's admirable paper on *Pottia* (See Journ. Bot. IX. (1871) p. 2). This great bryologist takes by far the most philosophical view of the group when he advocates the union of *Pottia, Desmatodon, Trichostomum* and *Tortula*, into one natural genus; as a matter of convenience, however, I retain here the three principal, though every one who studies them will find that the lengthening of the teeth of *Trichostomum*, and their twisting into those of *Tortula*, is so gradual that it is difficult to draw the line between them, while it separates such closely allied species as *Trich. cylindricum* and *Tort. tortuosa*. In *Tortula* I adopt the sections used by De Notaris.

Ephemerella recurvifolia, Dicks.

Phascum.—1, *P. triquetrum*, Spruce; 2, *P. muticum*, Schreb.; 3, *P. Flörkeanum*, W. and M.; 4, *P. acaulon*, L. (*cuspidatum*, Schreb.); 5, *P. curvicollum*, Hed.

Pottia.—1, *P. pusilla*, Hed. 1782 (*cavifolia*, Ehrt. 1787); 2, *P. recta*, Lindb. (*Phascum rectum*, With.); 3, *P. Starkeana*, Hed.; 4, *P. cæspitosa*, Bruch; 5, *P. truncatula*, L.; 6, *P. crinita*, Wils.; 7, *P. Wilsoni*, Hook.

8. *P. littoralis*, Mitten, Journ. Bot. IX. (1871), p. 4. Leaves quinquefarious, oblong, subspathulate, the lower pale, upper green; upper cells half the size of those in *P. truncatula*, lower oblong pellucid, all smooth; nerve excurrent. Capsule oblong-oval, somewhat narrower at the mouth, lid rostrate, slightly twisted, male flower gemmiform. Beach at Aldrington and Hastings. I have not seen specimens.

9. *P. asperula*, Mitten, Journ. Bot. 1871, p. 4 (Plate CXIX. f. 3). Leaves quinquefarious, obovate-spathulate, acute, upper cells rhomboidal and quadrate hexagonal with obtuse papillæ, lower oblong, pellucid, nerve excurrent. Calyptra with a few scattered papillæ; capsule oval; lid rostrate, antheridia naked in the axils of upper leaves.—Hab. Henfield Mitten; Penzance, Curnow; Jersey, Piquet.

10. *P. viridifolia*, Mitten, Journ. Bot. 1871, p. 5 (Plate CXIX. f. 4). Leaves octofarious, obovate-spathulate, obtuse, nerve excurrent, margin

recurved in the middle, upper cells hexagonal, very minutely papillose, lower oblong, pellucid. Antheridia as in last; seta short, calyptra smooth, capsule oblong, lid rostrate. Crevices of slate rocks. Plymouth, Holmes.

11. *P. Heimii*, Hed. 12. *P. bryoïdes* (Dicks.). 13. *P. lanceolata*, Hed.

14. *P. intermedia*, Turn.—*Gymnost. intermedium*, Turn. Musc. Hib. p. 7. t. 1. f. a–c.—Plants larger than those of *P. truncatula*, and resembling *P. lanceolata;* leaves with the margin revolute for the lower half, capsule subcylindric, slightly contracted below the mouth; annulus compound, peristome rudimentary. Not uncommon in south of England, and very different from *P. truncatula*. Mr. Mitten unites it to *P. lanceolata*.

15. *P. latifolia*, Schw., C. Müll.

Trichostomum.—1, *T. cernuum*, Hueb.; 2, *T. cylindricum*, Bruch; 3, *T. rubellum*, Hoff.; 4, *T. luridum*, Hsch.; 5, *T. tophaceum*, Brid.; 6, *T. brachydontium*, Bruch, 1829 (*T. mutabile*, Bruch, 1838); 7, *T. crispulum*, Bruch.

8. *T. flavo-virens*, Bruch and Muell. (Reg. Bot. Zeit. 1829). Dioicous, laxly tufted, dichotomous, the innovations originating at the fertile coma, soft yellow-green. Leaves laxly imbricated, erecto-patent, twisting, straight when moist, comal from an oblong base, longly linear-lanceolate, the margin strongly undulate, nerve thick, yellowish, smooth at back, prolonged into a short acute point. Cells at base very thin, elongated, above minute, hexagonal, very finely papillose, the margin above base bordered with very thin pellucid cells. Capsule on a long purple pedicel, erect, ovato-cylindric, pale, exannulate; lid conic, obliquely rostrate; teeth straight deep purple, roughish.—Hab. Shoreham Beach, Mitten; Plymouth, Holmes; Malahide, Dr. Moore; all barren.

9. *T. littorale*, Mitten (Seem. Journ. Bot. VI. (1868) p. 99). In compact tufts, simple or divided by innovations. Leaves comose, yellowish green, fuscous when old, erecto-patent, slightly recurved towards apex, oblong ligulate, obtuse, channelled, nerve excurrent in a short mucro; cells at base hyaline, oblong and rectangular for as high as half width of leaf, but not ascending up the margin, above shorter, rounded and obscure. South Coast: Plymouth (Holmes); Hastings (Mitten), Brighton (Davies).

Tortula.

Sect. 1. *Aloidella.*

1. *T. stellata*, Schreber, 1771.—*T. rigida*, Hed. 1787. 2. *T. ambigua*, B. and S. 3. *T. aloïdes*, Koch.

Sect. 2. *Cuneifoliæ.*

4. *T. lamellata*, Lindberg.—*Pottia cavifolia*, δ. *barbuloïdes*, Durieu. *Pottia gracilis*, Boswell. *P. cavifolia*, var. *gracilis*, Bry. Brit. *Barbula cavifolia*, Schp. Musc. Eur. Novi fasc. 3 and 4. *B. concava*, Schp.—Monoicous, in loose incoherent tufts. Stems short, simple; lower leaves smaller; roundish-oval, piliferous, upper broadly oval and spathulate, pointed, perichætial narrowly spathulate and piliferous; all very concave, with the margin flat, papillose on the back, nerve vanishing with the apex, bearing four decurrent lamellæ; cells at base elongated hexagonal, hyaline, above minutely quadrate and chlorophyllose. Setæ longish;

capsule subcylindric, often slightly curved, rufous brown, furrowed when dry, lid with a long oblique beak, annulus simple; peristome imperfect, clathrate at base, thence of slightly twisted unequal teeth, which break away with the lid.—On clay covered walls. Bicester and Oxford (Boswell), Aldrington (Davies), near Edinburgh, Pontefract (Nowell).

5. *T. atrovirens* (Smith), Lind.—*Grimmia atr.*, Eng. Bot. t. 2015 (1809). *Trichostomum convolutum*, Brid. *Didymodon nervosus*, Hook. and Tayl. 6. *T. cuneifolia*, Dicks. 7. *T. marginata*, Br. and Schp.

8. *T. Vahliana*, Schultz. Monoicous, dwarf, gregarious, or in little tufts, resembling *T. muralis;* leaves oblong, cuneate, with the nerve prolonged into an acute green point; the margin scarcely, or above the base only, a little revolute, more laxly reticulated throughout; diaphanous, or but slightly opaque, papillose on the back, quite entire; upper cells minute angular, marginal rounded. Capsule oblongo-cylindric, often gently curved, lid short, suboblique, conic; basal membrane loosely tessellated, four times the width of the annulus. *Var. β. subflaccida; T. oblongifolia*, Wils. Leaves with the margins more or less revolute, crenulate, with minute papillæ. *T. Vahliana* was found by Mr. Davies at Angmering, in Sussex, and in May, 1871, by Messrs. Sheppard and Westell, between Mayford Heath and Pirbright Common. Woking, Surrey.

9. *T. canescens*, Mont. 10. *T. muralis*, Lin.

Sect. 3. *Barbula.*

11. *T. mucronata*, Bridel, Sp. Musc. i. p. 268 (1806).—*B. Brebissoni*, Brid. Bry. Univ. (1827), Schp. Musc. Eur. Nov. fasc. 3–4. *Cinclidotus riparius, β. terrestris*, Bry. Eur.—Dioicous, tall, in lax pale green tufts, becoming dirty brown by age. Stem 1–2 in. high, fastigiate branched, with reddish radicles at base. Leaves erecto-patent, twisted when dry, soft, elongato-lingulate, mucronate with the stout, excurrent nerve, concave, with the margin lightly recurved, and suddenly thickened above the base, minutely papillose on both surfaces; cells at base hyaline, hexagono-rectangular, at apex minute, rounded hexagonal. Capsule on a stout yellow pedicel, erect, cylindraceous, slightly incurved; lid obliquely rostrate; teeth on a short tube, joined here and there at base, then free and once twisted to the left, papillose, orange.—Mr. Davies sends me specimens in fruit from Sussex.

12. *T. unguiculata*, Hed. 13. *T. convoluta*, Hed. 14. *T. revoluta*, Schrad. 15. *T. Hornschuchiana*, Schultz.

16. *T. vinealis*, Brid. Bry. Univ. i. p. 830.—Stem erect, fastigiate branched, with 2 or 3 innovations below the perichætium. Leaves laxly imbricated, patent, straight, when dry appressed, not crisped, recurved at apex, ovato-lanceolate, very acute, margin flattish, nerve stout, coloured, becoming obscure and lost in the apex. Cells at base rectangular hyaline, above rotundato-quadrate, fulvous. Capsule oblong, nearly equal, when empty subcylindric; lid narrowly conical, incurved, somewhat obtuse. Fruit ripe in May.—On walls, south of England.

17. *T. insulana*, De Notaris, 'Syllabus,' p. 180.—*Barbula vinealis, β flaccida*, Bry. Eur. *T. vinealis*, Bry. Brit. (Plate CXX. fig. 1).—Laxly tufted; stem erect, elongated, branched from the base. Leaves crowded, widely spreading, long and narrow, recurved, or hooked, from an erect base, appressed to the stem, lanceolate, becoming linear and subulate, margin at base erect, above plane, entire, nerve reaching apex;

when dry the leaves are twisted and cirrhate. Capsule terete-oblong, erect; lid conico-attenuated, half length of capsule. De Notaris afterwards united this to *vinealis*, but Mr. Mitten pointed out their distinctness in Seem. Journ. Bot. 1867, p. 325.—Bolton Abbey, Wyndcliff, Aldrington Beach, and Cuckfield (Davies), Plymouth (Holmes).

18. *T. rigidula* (Hed.).—*Didymodon rigidulus*, Hed. Mus. Fr. iii. t. 4; Hook. and Tayl. Musc. Br. *Trichostomum rigidulum*, *β. densum*, Bry. Eur.; Bry. Brit. p. 114. *T. neglectum*, Wils. ms. (Plate CXIX. f. 5).—Dioicous, densely tufted, subpulvinate. Leaves rigid, not appressed and imbricated when dry, but somewhat curved and contorted, lanceolate, carinate, the base erect and appressed to stem, the nerve thick and continued with the lamina into a thick obscure point; cells at base oblong, pellucid with thin walls, soon becoming incrassate and quadrate. Fruit like that of *T. spadicea*, peristome longer.—HAB. On walls.

19. *T. spadicea*, Mitten; Seem. Journ. Bot. 1867, p. 326.—*Trichostomum rigidulum*, Bry. Eur.; Bry. Brit. (Plate CXIX. f. 6).—Dioicous, 1–2 in. high, resembling *T. fallax*, but more robust, dull green, laxly tufted. Leaves patent from the base, when dry incurved and closely imbricated, elongato-lanceolate, channelled, the margin recurved below; nerve distinct to the apex; cells rounded and incrassate from the very base, somewhat obscure. Capsule on a red seta, erect, cylindric; lid shortly subulate, slightly twisted. Peristome short; teeth narrow, on a very short membrane.—Damp walls and rocks, not uncommon.

20. *T. fallax*, Hed.—*Bryum imberbe*, Huds. Fl. Angl. 1762.—Lindberg adopts Hudson's name; but as it was founded on the erroneous idea that there was no peristome, it is better to drop it.

21. *T. reflexa*, Bridel, Sp. Musc. i. p. 255 (1806).—*Barbula fallax*, *γ. reflexa*, Brid. Bry. Un. i. p. 558. *Tortula recurvifolia*, Wils. Ann. Nat. Hist. ii. ser. 3. p. 491. *Barbula recurvifolia*, Schimper. *Tortula fallax*, *δ. recurvifolia*, Bry. Brit. (Plate CXX. f. 2).—Dioicous, rufous-brown, in lax incoherent tufts, more slender than *T. fallax*. Leaves tristichous, recurved and falcate, when dry laxly incumbent, slightly twisted from an oblong base, lanceolate, shorter and broader than those of *T. fallax*, acutely keeled, strongly papillose on both sides, nerve vanishing below apex, margin reflexed below; capsule erect, elongated, cylindraceous, regular, rufous-brown; lid subulate, beaked; annulus none; peristome as in *T. fallax*. Very rare in fruit.—Calcareous rocks and walls. Scotland, Yorkshire, Derbyshire, near Rydal water (Baker).

22. *T. rufa*, (Lorentz) Braithw.—*Didymodon rufus*, Lorentz, Moos-Studien, p. 121, 1864 (Plate CXX. f. 3).—Dioicous, resembling dwarf *T. gigantea* in rufous-brown, lax, incoherent tufts. Stems 2–5 in. long, often prostrate at base, sparingly dichotomous, dense leaved. Leaves recurved when moist, solid, from an ovate base, lanceolate, gradually apiculate; margin strongly recurved; nerve vanishing just below apex. Cells at base rhomboid, pellucid, at apex minute, quadrate, papillose, opaque. Perigynium enclosing long-necked archegonia, without paraphyses.—Reported from Ben Lawers by Dr. Stirton, but I have not seen British specimens.

23. *T. recurvifolia*, Mitten, Proc. Linn. Soc. i. Suppl. p. 34, 1859.—*T. vinealis*, var. *nivalis*, Spruce. *Grimmia gigantea*, Schp. Synops. p. 695, 1860. *Tortula gigantea*, Lindberg (Plate CXX. f. 4).—In large, fuscous-green, loose tufts, blackish-brown at base. Plants 3–8 in. high, simple or

bi-tripartite, robust, dense-leaved, with a few radicles. Leaves trifarious, squarroso-recurved, when dry twisted and somewhat crisped, elongate, lanceolate, concave, complicate towards apex; margin strongly revolute; nerve strong, reaching apex; cells at base elongated, with sinuous walls like those of *Rhacomitrium*, above irregularly stellate.—Dripping alpine rocks. Ben Bulben, Sligo (Moore).

Sect. 4. *Syntrichia*.

24. *T. princeps*, De Notaris, Syll. p. 170, 1838.—*Barbula Mülleri*, Bry. Eur. 1842. 25. *T. ruralis*, L.

26. *T. intermedia*, Bridel, Bry. Univ. i. p. 586.—*T. ruralis*, *β. minor*, Bry. Brit. *Barbula ruralis*, *β. rupestris*, Schp.—Dioicous, resembling *T. ruralis*, but growing in short, compact tufts, rufescent when dry, and very hoary from the long hair-points of the leaves. Stem short, fastigiate branched. Leaves crowded, erect, appressed when dry, oblong spathulate, carinate, obtusely rounded at apex; margin recurved, and without the two longitudinal striæ seen in *ruralis;* hair-point often longer than the leaf, serrated. Cells twice smaller, very obscure, and papillose. Seta and capsule much shorter, and also the teeth of peristome.—Calcareous rocks and old walls.

27. *T. papillosa*, Wils. 28. *T. latifolia*, Bruch. 29. *T. subulata*, L. Lindberg considers *T. mucronifolia*, to be a variety of this.

Sect. 5. *Tortuosæ*.

30. *T. tortuosa*, (L.) Ehrt.

31. *T. hibernica*, Mitten, Seem. Journ. Bot. 1867, p. 329.—*Anœctangium Hornschuchianum*, Bry. Brit. *Trichostomum cirrhifolium*, Schp. ms. *Didymodon controversus*, Wils. ms. (Plate CXX. f. 5).—Stems elongated, 2–4 in. high, branched. Leaves laxly inserted, somewhat comose, and stellate at summit; the base erect, dilated and clasping above, thence spreading and divergent, ovato-lanceolate, passing into lineal-subulate, acute, nearly straight, channelled, cirrhate when dry; nerve yellowish, continued to apex, smooth at back; margin erect, quite entire. Cells at base pellucid, elongate, rectangular, quickly passing into the minute rounded obscure ones which form the rest of the leaf.—Mountains at Dunkerron, Killarney. *Anœctangium Hornschuchianum* has the basal margin serrulate, and in *Trichostomum cylindricum* the base is scarcely wider than the upper part.

32. *T. nitida*, Lindberg, Oefv. Vet. Ak. Förhand. 1864, p. 252.—*Trichostomum diffractum*, Mitten, Seem. Journ. Bot. 1868, p. 98.—Densely cæspitose, blackish-green. Stem short, rigid, dense leaved, branched. Leaves erecto-patent, when dry arcuato-incurved, lanceolate, obtuse, channelled, quite entire; margin plane, a little undulated; nerve terete, very thick, and ending in a very short apiculus, when dry pale, and glossy on the back; upper cells indistinct, very minute, densely papillose, those of base much larger, pellucid, ascending obliquely upward toward margin. Leaves very fragile, and usually broken in the middle.—South-west coast, Plymouth (Holmes), Torquay (Borrer), Shoreham Beach (Nowell).

33. *T. sinuosa*, Wilson, ms.; Mitten, Journ. Bot. 1867, p. 327.—*Trichostomum sinuosum*, Lindberg. *Dicranella sinuosa*, Wils. (Plate CXX. f. 6).—Densely cæspitose, dull yellow-green above, fuscous below. Stems

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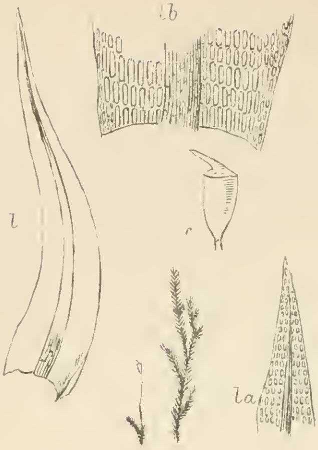

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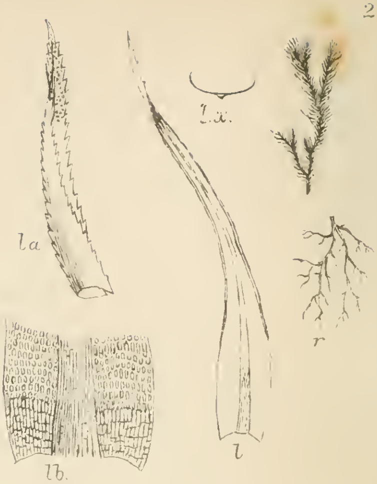

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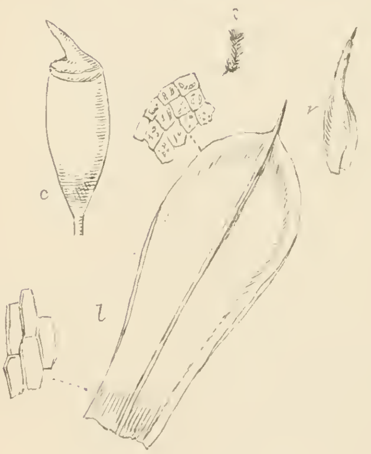

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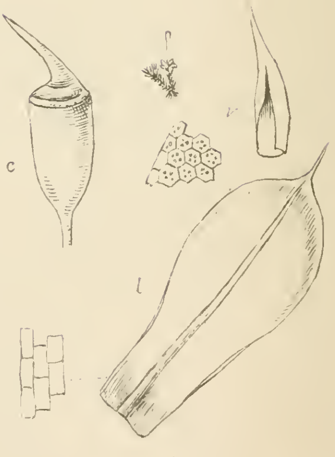

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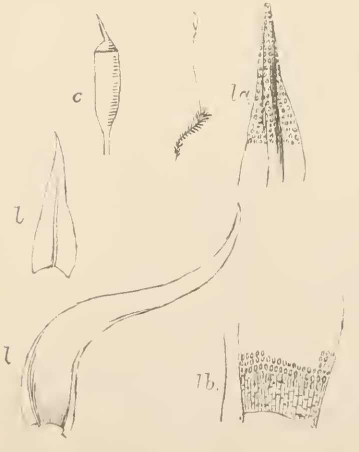

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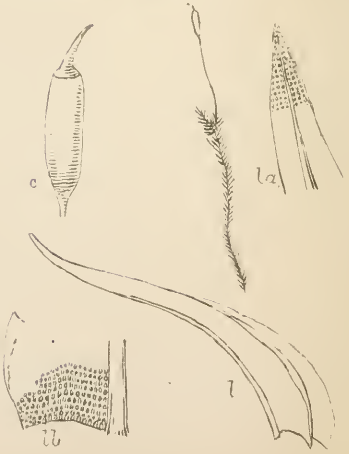
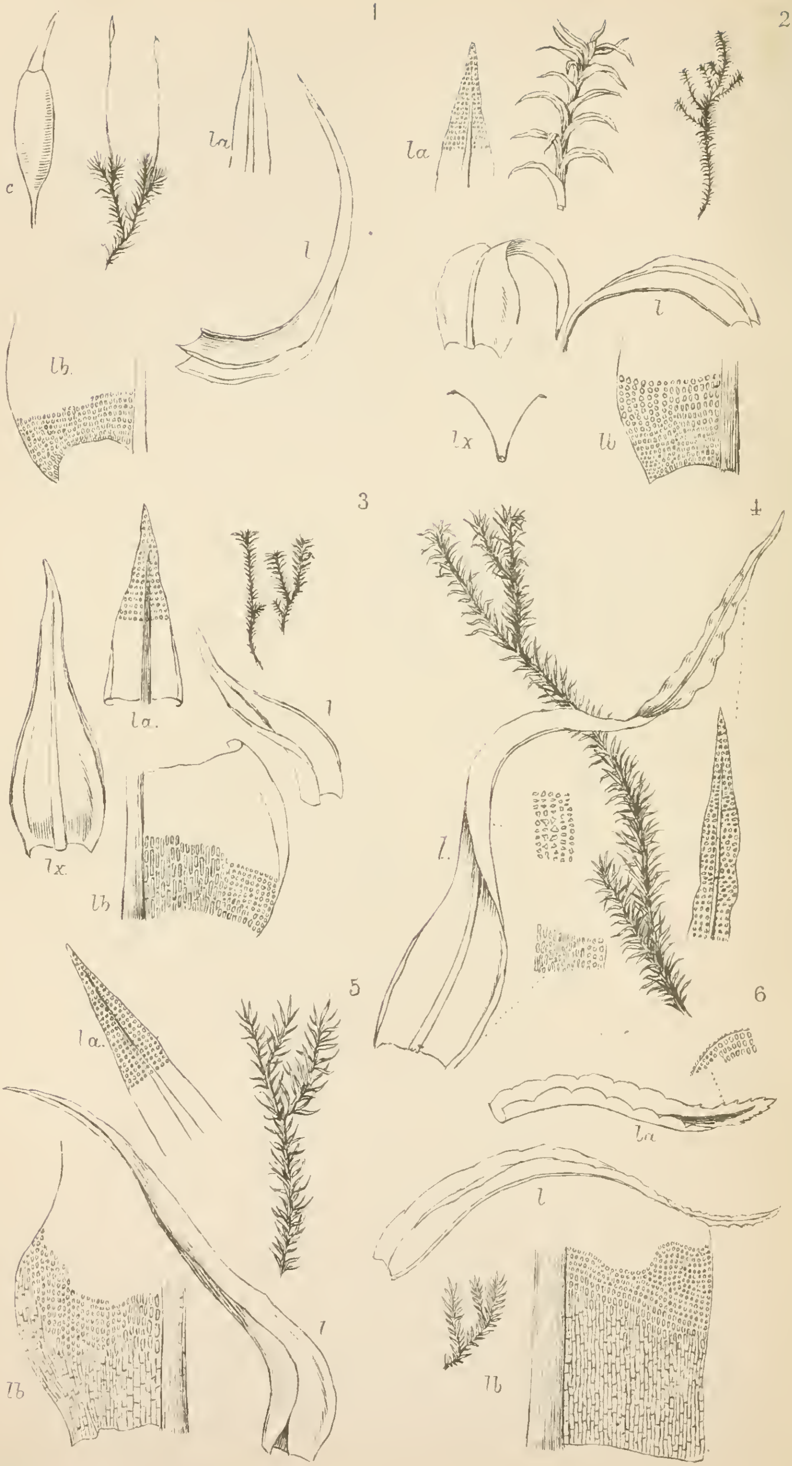


R. Braithwaite ad J. Huxley lith.

Mintern Bros imp.

Tab. 120.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R Braithwaite del. J.H.Hipsey lith.

Mintern Bros imp

interwoven with long reddish radicles, dichotomous, ½–1 in. high, dense leaved. Leaves long, lineal-lanceolate, becoming subulate toward apex, fragile, cirrhate, and twisted when dry; base short, erect, of numerous rectangular, pellucid cells, upper part carinate, with rotundate quadrate cells, which become obscure at apex; nerve reddish, extending to apex; margin a little recurved below, sinuous in the upper half, and with a few irregular denticulations just below the point.—HAB. On old walls, Bangor (Wilson, 1863); on tree roots on the chalk downs of Sussex, Woolsonbury, Arundel, etc. (Davies), Cornwall (Borrer), Plymouth (Holmes).

34. *T. fragilis*, Hook.—*Didymodon fragilis*, Hook. in Drum. Musc. Amer. 1828. *Tortula fragilis*, Wils. *T. Drummondii*, Mitten.—Dioicous, resembling *T. tortuosa*, in dense interwoven tufts. Stem erect, dichotomous, clothed below with tomentum. Leaves densely crowded, lower lanceolate, upper longly subulate, and all channelled, entire, with an excurrent nerve, very fragile, erect when moist, squarroso-falcate when dry; cells at base hyaline, above minute, papillose on both sides. Capsule erect, ovate-oblong, slightly curved; lid conic, with a long oblique beak.—Wet clefts of rocks. Ben Lawers (M'Kinlay, 1865).

35. *T. squarrosa*, Brid.—*Pleurochæte squarrosa*, Lindberg.

Ceratodon purpureus, L.

EXPLANATION OF PLATES CXIX. AND CXX.

PLATE CIX.—Fig. 1. *Weisia commutata*. Fig. 2. *W. truncicola*. Fig. 3. *Pottia asperula*. Fig. 4. *P. viridifolia*. Fig. 5. *Tortula rigidula*. Fig. 6. *T. spadicea*.

PLATE CXX.—Fig. 1. *Tortula insulana*. Fig. 2. *T. reflexa*. Fig. 3. *T. rufa*. Fig. 4. *T. recurvifolia*. Fig. 5. *T. hibernica*. Fig. 6. *T. sinuosa*. *l* leaf; *l a* leaf apex; *l b* leaf base; *l x* leaf section; *c* capsule; *v* calyptra; *r* radicles.

ON THE FLORA OF THE ISLE OF WIGHT.

BY ROBERT TUCKER, M.A.

The warmest thanks of all persons interested in the botany of the Isle of Wight are due to Mr. A. G. More for his full Supplement to Dr. Bromfield's excellent 'Flora Vectensis,' contained in previous numbers of this Journal. His labours and successes in this field are second only to (if not on a par with) those of his lamented predecessor. If it were not too much to expect from one who has so many calls upon his time already, one could wish that he would concentrate his powers in the drawing up a new Flora of the district, eschewing the descriptions given by Dr. Bromfield, and modelled (as I have suggested, Vol. VIII. p. 158) on the 'Flora of Middlesex' type. It might be brought out as the first part of the long-looked-for 'Flora of Hants.' A "handy-book" to the botany of the Island is, I think, a real desideratum; and as no one is so competent for the work as Mr. More, I hope, if he reads these remarks, he will consider the matter favourably and "make a note of it."

In such a work as Dr. Bromfield's there are, of course, many little inaccuracies; and the number of these was most likely increased by the circumstances under which the work was edited. I may, perhaps, point out some before I close my remarks. There are some few also which I have detected in the Supplemental Notes. I shall not dwell very particularly upon these, but first record some few additional localities of my own, principally detected in the years 1864 and 1865. Following Mr. More's example, I shall endeavour not to give any which have been recorded elsewhere publicly. I do not know if the MSS. observations made by Dr. Bromfield in his interleaved copy of the 'Flora Hantoniensis' (preserved at Kew) have appeared in print, but shall forbear to give them.

Ranunculus hederaceus, L. Dr. Bromfield and subsequent writers seem to have overlooked Fl. Vectiana, p. 23. "In a pond near Pann, Weston, St. Helen's, etc."

R. parviflorus, L. Fields near Tolt Copse, 1864 and 1865; field near Beckett's Copse, 1870.

Berberis vulgaris, L. (p. 75). Only *one* locality is in Fl. Vect.

Papaver somniferum, L. Field near Tolt Copse.

Chelidonium majus, L. Bowcombe; Gatcombe; and near other hamlets, seldom more than two or three plants in a locality.

[*Lepidium Draba*, L. I am under the impression that Mr. Stratton and I found this on the railway line from Newport to Cowes, May, 1868; but as he does not remember our having found it, and the entry in my notebook has a query appended, most likely I am in error.]

Helianthemum vulgare, Gært. (p. 136). The authority should be D. Turner, as in Snooke, p. 22; Bromfield, p. 50; not given in 'Botanist's Guide' (T. and D.).

Saponaria officinalis, L. I saw this plant in Mr. Watson's locality at Freshwater, and looked upon it there as nothing more than an escape from a garden. I have not seen the plant there for some years past.

Lychnis vespertina, Sibth. With pale pink or flesh-coloured flowers, Arreton.

Malva moschata, L. St. George's Down.

M. rotundifolia, L. Arreton churchyard; still very frequent about Freshwater.

Hypericum Androsæmum, L. Dr. Bromfield has omitted references to Bot. Guide, p. 320; Fl. Vectiana, p. 29. In copses about Freshwater.

Geranium Robertianum, L., fl. albis. Blackwater marsh.

Trifolium subterraneum, L. Gurnett, 1864 (and, I think, St. George's Down, 1865).

T. incarnatum, L. Bridge near Freshwater Church, 1871.

Medicago sativa, L. Field near Amos Hill; slipped land by fort, Colwell Bay; and field near Murrow's Hotel, Freshwater, in 1870, the first locality in 1871 also.

Rosa tomentosa, Sm. "Isle of Wight, Mr. S. Woods"; Bot. Guide, p. 318; not given in Bromfield.

Sedum anglicum, Huds. (p. 142). This is the plant correctly quoted by Dr. Bromfield from Garnier's list (l. c.), and not *S. Telephium*. Warren in Freshwater; Fl. Vectiana, p. 19.

S. dasyphyllum, L. Only a few plants detected on Brading Church, by Messrs. Stratton, Warner, and myself this year, in consequence of alterations. (*Ceterach officinarum*, Willd., I fear is also almost, if not quite gone.)

Chrysosplenium oppositifolium, L. First detected by me, I think, in Spring Lane, Carisbrooke, April 30th, 1864; grows much less extensively there now, as stated by Mr. Stratton.

Conium maculatum, L. A few plants on Bowcombe Down, 1865.

Picris hieracioides, L. Near Watergate, Newport.

Cichorium Intybus, L. "Field between Cowes and Newport." Fl. Vectiana, p. 30.

Erigeron acris, L. Several places about Freshwater, roadside near Norton; "near Whitecross," Fl. Vectiana, p. 31.

Cineraria campestris, Retz. I think Mr. More's remarks on "Belhan" have set this matter at rest. The examination of Garnier's list almost convinced me as to the correctness of the hypothesis I had long before formed.

Inula Helenium, L. Also in a hedge bordering the marsh at Easton. The Totland plants are generally cut down before the flowers are fully blown.

Vinca major, L. In the Fl. Vectensis the station at Yarmouth, quoted *W. D. Snooke*, should be "Withering, Bot. Guide and Fl. Vectiana." Near Bowcombe Farm, an escape.

Gentiana campestris, L. (p. 167). The date is, by a mistake, given 1869, instead of 1864, as in the paragraph cited (Vol. VIII. p. 160).

[*G. collina*, With., of Garnier's list, is only *Campanula glomerata*, L. See Fl. Vect. p. 291 note.]

Hyoscyamus niger, L. Very plentiful on shore near Hampstead Ledge. (I feel sure this must have been recorded, but cannot lay my hand upon the record.)

Solanum nigrum, L. Gurnett; St. George's Down; New Village, Newport; Freshwater.

Ajuga reptans, L. β (fl. albis). Forest Road, south side, near Gunville Lane, June, 1865. γ. (pink flowers). Gurnett, 1865.

Nepeta Cataria, L. Near the racecourse, Bowcombe Down, in one spot, with Mr. Stratton; hedge at back of old windmill, Freshwater, 1865; Amos Hill, Freshwater, 1870.

Plantago Coronopus, L. Cowes, Freshwater, etc., 1865.

[*Atriplex Halimus*, L. What I take to be this shrub, has attracted my notice for some years on the bank of the stream close to the bridge near Freshwater Church. I have never seen it in flower.]

Polygonum littorale, Link. Totland's Bay, June 30th, 1864; June 1st, 1865. (A *Polygonum*, which I took to be *P. Raii*, I found also at Totland's Bay August 16, 1864; August 24, 1865—confirmed in my diagnosis by Journal, p. 171.)

Epipactis latifolia, Sw. The authority for Shanklin and Godshill, Bromfield, p. 489, should be referred back to Bot. Guide.

(*Malaxis paludosa*, Sw. As I have shown in 'Science Gossip,' (1870, p. 234), this plant is stated by Dr. Bromfield in the Kew MSS. of the 'Flora Hanton.' F. v. vol. x. p. 112 note, to have been mentioned to him by Dean Garnier as one which the Dean believed he had found in the island.)

Allium vineale, L. Three or more years running in the hedge of a field at the back of Middleton House; abundant and finely in flower by the Yar (east bank), 1870.

Asplenium Ruta-muraria, L. Plentiful on Thorley Church, most likely will be destroyed by the alterations.

Asplenium Trichomanes, L. On the north side of Carisbrooke Church, 1864.

There is a slight confusion in the 'Flora Vectensis' in the case of some few plants as to book authorities, cf. *Mentha rotundifolia* and *M. piperita*, with the Bot. Guide and Fl. Vectiana; also the Doctor omits generally to give Mr. Snooke's references to first discoverers (this last writer, however, is not always correct).

But I must only further refer to the subject of localities by citing one or two additional extracts, besides those which I have given in former numbers. The author of 'Holiday Excursions of a Naturalist' writes, that he found "*Thesium* on the chalk downs (p. 50); near Luccombe, under the cliffs, grew the *Lathyrus sylvestris*, Madder, and *Asperula cynanchica*" (p. 53); "we found *Orchis fusca* in a thicket in the Undercliff; *Iris fœtidissima* abounded in places—*Monotropa* and *Silene anglica*, also to be found," this at Ventnor (p. 53) (has *O. fusca* really been found in the island?); then at Carisbrooke "we picked *Thesium* below the castle walls, and *Astragalus Hypoglottis* and *Teucrium Chamædrys* are also to be found in this locality" (p. 56). As regards the last two plants our author is evidently quoting from ancient authority, which had perhaps no solid foundation in fact.

In Priscilla Wakefield's 'Family Tour through the British Empire,' 15th ed. 1840) I find that (p. 455) near Ventnor "the elegant wood-vitch, larger fumitory, and wild maddor (so are the plants named) were presented to the young botanists."

As I have elsewhere stated ('Science Gossip,' 1870, p. 261), there are thirty-two Isle of Wight plants given in the 'Hampshire Repository List.' These are cited in the 'Flora Vectensis' as due to Pulteney; the author's explanation of the matter is given in the 'Phytologist,' vol. iii. p. 428. The authors of the 'Botanist's Guide' (1805) quoted this list as Pulteney's, yet they could hardly have seen it, I think, as they omit references to sixteen of the Isle of Wight plants, and other plants, as I have shown (S. G. l. c. *supra*), they quote as on Pulteney's authority, which are not included in the list. These last may possibly have been taken from the 'Catalogue of Plants of Dorset." As the Vectensian plants in this list are so few, and the work is a scarce one, I have thought it well to transcribe it. *Iris fœtida*, Isle of Wight; *Tamarix gallica*, Freshwater, Isle of Wight; *Linum usitatissimum*, Isle of Wight; *L. tenuifolium*, near Ryde, Isle of Wight; *Scilla verna*, near Newport, Isle of Wight; *Chlora perfoliata*, Isle of Wight; *Erica vulg., cinerea, Tetralix*, all varieties white, Isle of Wight; *Teucrium Chamædrys*, Carisbrooke Castle, Isle of Wight; *Orobanche cærulea*, Steephill, Isle of Wight; *Pisum maritimum*, Sandown Beach, Isle of Wight; *Lathyrus latifolius*, ditto; *Cineraria alpina*, Belhan, fl., Isle of Wight; *Ophrys apifera*, Steephill and Carisbrooke, Isle of Wight; *Osmunda regalis*, Isle of Wight,—all these are given in the 'Botanist's Guide.' *Vinca major*, Yarmouth, Isle of Wight, the authors quote on the authority of Withering. The following they pass over altogether:—*Convolvulus Soldanella*, Brading Harbour, Isle of Wight; *Chironia Centaurea*, var. white, Isle of Wight; *Thesium linophyllum*, Steephill, Isle of Wight; *Gentiana collina*, found by Dr. Withering upon the barrows in the highest part of Afton Down, east of Freshwater Bay, Isle of Wight; *Crithmum maritimum*, or Samphire, on the chalk cliffs, from the Needles to Freshwater Gate, Isle of Wight; *Eryngium maritimum*, Isle of Wight; *Narthecium ossifragum*, Freshwater Beach, Isle of Wight; *Arenaria marina* (*A. rubra*, Huds.), Freshwater

Cove, Isle of Wight; *Sedum anglicum*, south side of Brixton Down, Isle of Wight; *Chelidonium glaucium*, Isle of Wight; *Althæa officinalis*, Ryde beach, Isle of Wight; *Tanacetum vulgare*, Sandown and Northcote, Isle of Wight; *Matricaria Parthenium*, Steephill, Isle of Wight; *Ophrys spiralis*, Steephill; *Carex arenaria*, sandy shore, north-east of Isle of Wight. In the list we have also *Chenopodium Bonus-Henricus*, common; *Crambe maritima*, western coast,—these are county plants, so the general reference may include Isle of Wight stations. There are two notes, one upon *Crithmum*, the other upon *Tamarix*. The Bot. Guide refers *Asparagus officinalis*, Freshwater, to *Pulteney* (the real Simon Pure, I presume). Dr. Bromfield gives the following:—*Tamarix*, *Scilla*, *E. cinerea*, *E. Tetralix*, *Sedum*, *T. Chamædrys*, *Pisum*, *Lathyrus*, *Cineraria*; and refers them to "Pulteney, Bot. Guide." *O. apifera* he refers to "Pulteney," but *Narthecium* he refers to "Messrs. Garnier and Poulter." All the rest he apparently ignores, so far as the 'Hampshire Repository' list is concerned; he refers *Asparagus* to "Pulteney, Bot. Guide." This analysis will, I trust, enable any possessor of the 'Flora Vectensis' to set the Pulteney question at rest.

Triticum loliaceum, Sm., is quoted on p. 599 from Fl. Vectiana, "Yarmouth, D. Turner;" it should be E. Forster, jun., teste W. D. Snooke.

In my copy of the 'Flora Vectiana' are some few localities written in pencil by a former possessor, one or two of which are of interest. The appearance of the writing leads me to the conjecture that they were made before the publication of the Fl. Vectensis:—"*Verbena*, near Brading; *Symphytum officinale*, Sandown; *Euphorbia exigua*, *Antirrhinum Elatine*, fields by the roadside between Sandown and Shanklin; *Iris fœtidissima*, between Ryde and Shanklin; *Carduus Eriophorus*, *Anthyllis*, *Clinopodium vulgare*, *Origanum*, *Iris fœtidissima*, *Euphorbia amygdaloides*, between Luccombe and Bonchurch; *Anthyllis*, *Asplenium*, *Cynoglossum*, *Chlora perfoliata*, Steephill to St. Lawrence; *Asperula cynanchica*, cliffs near St. Lawrence; *Marrubium vulgare*, between St. Lawrence and Mirables; *Iris fœtidissima*, near Mirables."

I can only, in conclusion, add again that I trust we shall soon see a new 'Flora Vectensis;' and that, should a list of names of subscribers be called for, one may be made up sufficiently large to warrant any competent botanist in undertaking its preparation.

NOTES ON SOME IRISH PLANTS.

By David Moore, Ph.D., M.R.I.A.

During the last week of May this year, when botanizing on the Benbulben range of limestone hills, in county Sligo, along with Professor Thiselton Dyer, we picked up a few bits of *Draba rupestris*, on that part of the range known locally as King's Mountain. It was growing along with *Arenaria ciliata*, *Draba incana*, and *Saxifraga aizoides*, but seemed to be very rare; only two small plants were got of it.

This species has been recorded before as an Irish plant, being marked as such in Professor Babington's 'Manual of British Botany,' 2nd edition. At the time when publishing our 'Cybele Hibernica,' my colleague

A. G. More communicated with Professor Babington about this plant, who stated he had kept no note of the precise station, we therefore felt uncertain about it, and considered it safest to exclude the plant. I have since learned that Mr. W. Andrews, whose exertions in exploring parts of the flora of Ireland are well known, had either collected the plant himself on the Benbulben Range or had seen specimens collected there by the late Mr. Wynn, of Sligo. It is also recorded in Withering's 'Botany,' on the authority of the late Professor E. Murphy, who, we believe, knew he had made a mistake in taking *Draba incana* for it. Amidst these uncertainties, it is now satisfactory to know that the plant has again been seen in its Irish habitat. It is also interesting in a geographical point of view, this being the only portion of Ireland where the true alpine type of plants has yet been known to occur.

At a later period of the season, end of June, we visited the locality near Mullingar, where I had the previous year discovered *Pyrola rotundifolia*, for the first time in Ireland, and where we were able to collect a tolerably good supply of specimens of it in good condition.

At page 209 of Vol. VIII. of 'Journal of Botany,' I have a short notice of an alpine Willow, which I collected on the top of Muckish, a high mountain in county Donegal, which could not be well identified with any of our known species. Mr. Baker, who compared the specimens with those of the British Willows in the Kew Herbarium, thought it nearest to the plant named *Salix Grahami*, specimens of which were there from the Sow of Athol, Scotland. The smooth germens and smooth pedicels of the Irish plant inclined me to think it nearer to a form of *Salix Arbuscula*. Since the publication of the article in question, I was able to get living plants of *S. Grahami*, from Athol, which I had planted along with the Muckish plant, and now both are growing freely near to each other, showing, as they do, unmistakably, that they belong to the same species, only differing in some minor points, such as plants of the same species from different localities frequently assume. This opinion has also been confirmed by the Rev. J. E. Leefe, who is a well-known authority on British Willows. Mr. Leefe has further assisted me to correct an error we committed in 'Cybele Hibernica,' in considering *Salix procumbens* an Irish plant. The Benbulben Willow, mentioned under that species, is a dwarfed, decumbent form of one of the states of *S. phylicifolia*.

ON *MONOTROPA HYPOPITYS*, L.

By Fred. Stratton, F.L.S.

This plant, which has not been noted in the Isle of Wight for more than twenty years, has recently been rediscovered. Mrs. Pretyman, of Westover, kindly showed it to me, growing in tolerable abundance under Beech and Fir trees, not far from the house at Westover in August last, and a few days ago my eldest boy (aged three) found a plant growing under Beech at Carisbrooke Castle. It may be useful to note this recurrence of a plant of the nature of *Monotropa* after so many years during which it has apparently been absent; at least in the two localities above mentioned, in neither of which is it likely that it would have escaped observation. From Westover I was enabled to procure several large masses of the entire plant with the interlacing roots of trees amongst which it nestles, from an examination of which I hoped to have ascertained whether or not the plant was either wholly or partially parasitic. Though closely resembling in habit and general appearance *Lathræa squamaria*, *Monotropa* is not, I believe, parasitic in the same way nor to the same extent that that plant is. In *Lathræa* I have succeeded in tracing the actual connection between its roots and those of *Corylus Avellana*, the plant on which it is generally parasitic here; and I am able to confirm in many respects the statements made by Mr. Bowman in his paper on *Lathræa squamaria* in the 'Transactions of the Linnean Society,' vol. xvi. part 2. But as regards *Monotropa*, I have utterly failed to discover any immediate or direct communication between it and the roots amongst which it lies imbedded, except that the fibrous processes which envelope the roots or rootstock of *Monotropa* are closely applied, and to some extent adherent, to the roots of the trees. Both Beech and Fir grow around the plants at Westover; and I identified, by the strong resinous smell, some of the roots to which the *Monotropa* rootlets were clinging as some kind of Fir. In the station at Carisbrooke Castle only Beech-trees occur. The only discussion of late years upon the subject of the parasitism of *Monotropa*, appears, as far as I can find from the resources at my command, to be that in the first volume of the 'Phytologist,' to which Messrs. Luxford, Edwin Lees, W. Wilson, E. Newman, T. G. Rylands, and others, contributed their observations. Their opinions very widely differed, one of the most striking peculiarities of the plant, the fibrous clothing of the roots or underground stem being variously considered "the woolly matted extremities of the grasses which grew with the *Monotropa*;" "minute spongioles—sent forth in all directions;" "spongioles or suckers;" "fibrous extremities" or "root;" and lastly, "a byssoid fungus." Mr. Rylands, whose paper shows that he took considerable trouble in the matter, was so satisfied that this fibre was a fungoid growth, that he discovered and named four distinct species, which very pleasingly brought together the names of the several investigators—*Epiphagos Luxfordii* (Ryl. mss.), *Zygodesmus Berkeleyi* (Ryl. mss.), *Sepedonium Wilsoni* (Ryl. mss.), *Cladosporium Leesii* (Ryl. mss.). Now although "byssoid fungi" may occur naturally enough on the decaying and dead leaves and other vegetable matter beneath Beech or Fir trees, it is extremely difficult to believe that the substance so regularly and constantly enveloping the root or rhizome of *Monotropa* is of a fungoid character. The resemblance which was at once suggested to my mind by the appearance of this fibre was to the radicular fibres by which common Ivy clings to trees or walls, and this still seems to me to be a comparison well warranted by the observations I have been able to make.

The investigations of the well-known botanists whose names are above-mentioned were conducted just thirty years ago. It would be very satisfactory if English microscopists would, with their greatly advanced knowledge and improved apparatus, turn their attention to the question of the parasitism of this and some other plants. I must confess myself quite unable to decide whether or not *Monotropa* is parasitic at all. No actual connection has ever been observed; this seems to be the strongest point, because, although extremely difficult to discover and demonstrate, actual connection, beyond mere contact, has been proved to exist in the case of *Lathræa* and other parasitic plants; and, until this connection has been traced and seen in *Monotropa*, its parasitism must remain a theory only, and not an observed fact. On the other hand, with the strong presumption of its parasitism which the habit and appearance of the plant warrant, Professor Babington's statement ('Manual,' 6th ed. p. 220), "not parasitical," seems to require something more to support it than the negative evidence hitherto adduced. Successful cultivation of *Monotropa* as a non-parasitical plant would be perhaps as nearly positive evidence as the nature of the case would admit of, but as far as records go, this has not been done.* Has *Neottia Nidus-avis*, to which *Monotropa* has much likeness, been cultivated?

Whether the apparent radicular fibres of *Monotropa* are fungi or not, is a question which I cannot enter upon fully, but it may be observed that of the four "byssoid fungi" described by Mr. Rylands, only one is stated to be found "on *Monotropa* root generally," each of the other three being allocated to plants of *Monotropa* found in different places. Also that it is only the former one that is said to possess the colour which seems to be the common characteristic of the fibre—"brown;" the others being respectively described as "colourless," "pellucid white," and "pellucid straw-colour." Is it probable that a plant whose roots were so entirely covered with a fungus could exist, or at least flourish and propagate?

[Mr. Stratton's experience is that of all botanists who have investigated the question. Unger, Graves, Du Chartre, Guillard, Schacht, and Chatin have all failed to detect the slightest organic connection between adult *Monotropa* and the roots of any other plant. Chatin, however, in his beautiful 'Anatomie Comparée des Végétaux," has described and figured ('Plantes Parasites,' p. 257 and t. 52) a young individual attached to a ligneous root by a true perforating vascular cone, exactly as in *Orobanche*, and he suggests that, at least when reproduced by germination, *Monotropa* may commence life as a parasite. Unger (Ann. d. Wien. Mus. Bd. 2) thought that the plant lived on substances exuded by the roots amongst which it grows and with which its own are so intimately interlaced. Many botanists consider *Monotropa* a parasite in the sense of living on dead or decomposed vegetable matter, like Fungi. The subject cannot be considered settled.—H. T.]

SHORT NOTES AND QUERIES.

A NEW GENUS OF GENTIANACEÆ.—In vol. xxxix. of the 'Journal of the Asiatic Society of Bengal,' Mr. S. Kurz has published a full description, with plate, of the plant from Western Thibet, which he shortly defined in this Journal (Vol. V. p. 241), under the name of *Gentiana Jæschkei* (by accident spelt *Taschkei*). Mr. Kurz had originally considered it to form a new genus, but Professor Grisebach, to whom fragments were submitted (see note to the description *l. c.*), placed it in the *Amarella* section of *Gentiana*. Further examination has confirmed Mr. Kurz in his own opinion, and he now describes the genus *Jæschkea*, the species being renamed *J. gentianoides*. The chief character is found in the position of the filaments which are "actually terminal between the corolla-lobes, as is shown by the fact that the epidermis of the corolla overlies the vascular bundles leading to them." He considers the genus nearer to *Ophelia* than to *Gentiana*.

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* *M. uniflora*, L., a N. American species, has been cultivated in the botanic garden of Glasgow in leaf-mould, according to Sir W. Hooker, quoted by Chatin. (H. T.)

BOTANY (p. 114).—As no one has replied to Professor Dyer's interesting question, it may be of some service to draw attention to the earliest uses of this and the allied words, given in our dictionaries. In Richardson (1836) we have "Botanick Book," Cudworth, Intell. System, p. 326 (1678); "Botanist," Evelyn, Diary Ap. 12 (1694); "Botany," Brooke, 'Universal Beauty' (1735); Miller, Gardener's Dict. preface; "Botanologer," Brown's 'Cyrus' Garden' (1658). I have appended the dates of the earliest editions, so far as I have been able to ascertain them. In Latham's Johnson's Dictionary (1866) we have "improving my little skill in *botanics*," Ray, 'Correspondence,' p. 413; "Botanical Artist," Sir T. Browne's 'Tracts,' p. 6.—R. TUCKER.

THUIDIUM DECIPIENS, *De Notaris*, A BRITISH MOSS.—The Rev. J. Fergusson has contributed a note to 'Science Gossip' on this Moss, which he discovered in the spring of 1868 growing abundantly by the side of a streamlet, and about springs on the Clova mountains, at about 2800 feet. The late Mr. Wilson, at the time, considered the plant a form of *Hypnum commutatum*, but Mr. Fergusson, after re-examination, distributed it, in 1870, under the name of *Hypnum rigidulum*, n. sp. Juratzka has now determined it to be identical with specimens of *Thuidium decipiens*, De Not., lately published in the 23rd fascicle of Rabenhorst's 'Bryotheca Europæa.' The Moss occurs in Finmark and Italy; the fruit has not yet been described.

SEEDLING WILLOWS.—I have received from Dr. Moore, of Glasnevin, some remarks on my paper published in the August number of the 'Journal of Botany' (p. 225), "On Seedling Willows," stating his experience on the subject, which differs from mine. Dr. Moore, in the kindest manner, has requested me to communicate his observations to you, but I trust the readers of the Journal will not be deprived of his observations in a more direct form. Dr. Moore says, "My experience coincides with that of Sir James Smith, as stated by you in the quotation made in the 'Journal of Botany' from 'The English Flora.'" I am glad to admit that Dr. Moore has sent me some undoubted seedlings, of one and two years old, of *S. phylicifolia*, L. = *S. tricolor*, Koch, Ehr., and also one gathered near to a plant of *S. triandra*. I have not heard anything of seedlings from any other quarter, and have seen none in my own garden this year. It thus appears that Willows do undoubtedly spring readily from seed in the Glasnevin Botanic Garden, where the climate appears favourable to their production, and a good opportunity is presented of ascertaining whether, as stated by Sir J. E. Smith, the seedlings thus springing up are true to their kind. I hope Dr. Moore will be able to clear up this point also.—J. E. LEEFE.

A query in the January number of this Journal (p. 15) seems to imply some doubt as to the production of "genuine ripe seed" upon Willows and Poplars in this country. Mr. Leefe (p. 227) also thinks it happens with Willows less frequently than is generally supposed. I was surprised, therefore, to come upon a passage in Linnæus's 'Amœnitates Academicæ' (vol. i. p. 100), which speaks of the seminal fertility of Willows and Poplars as a thing to be guarded against. "Ambulacra ex Populo vel Salice formare cupiens, solos mares assumat; si enim feminæ terræ mandentur, multiplicantur, ita ut nemus loco ambulacri forment." The advice, however, might merely be an assumption deduced from the trees being monœcious. It may, perhaps, be a piece of evidence on the other side that De Candolle ('Physiologie Végétale,' ii. 724) remarks, 'Nous possédons depuis peu les deux sexes du Saule pleureur (voyez Spenner, Fl. Frib. iii. p. 1061), mais ils n'ont pas encore produit de graines." However, that Willows *are* hybridizable is proved by the existence of a book, by Max Wichura, entirely devoted to the experimental investigation of the subject ('Die Bastardbefruchtung . . . der Weiden,' 1865). Mr. Darwin, quoting from it, remarks in the 'Origin of Species' (4th ed. p. 315), "It is known that hybrids raised from very distinct species are sometimes weak and dwarfed, and perish at an early age, of which fact Max Wichura has recently given some striking cases with hybrid Willows." And in his 'Animals and Plants under Domestication' (vol. ii. 267), he mentions that "Max Wichura united six distinct species of Willows into a single hybrid" (by successive crosses).—W. T. THISELTON DYER.

I noticed about a month ago in one of the flower-beds, which occupy the site of the old reservoir near Grosvenor Gate, Hyde Park, a single seedling plant of *Salix Caprea*, L. This was then about a foot high. I did not think from its appearance and regularity of growth, vertical as well as lateral, that this could be a willow-cutting which had been stuck in to protect some young plant, and which had subsequently taken root on its own account. But the plant is easily found if any botanist cares to investigate the subject further, as the site of the old reservoir does not occupy many roods of ground.—J. L. WARREN.

MIDDLESEX PLANTS.—Between Primrose Hill and King Henry's Road I have noticed this year many luxuriant plants of *Rumex palustris*, a well-known but somewhat rarely-occurring member of the London flora. Near the same place I also found single individuals of *Bromus arvensis* and *Galinsoga parviflora*. The occurrence of the last plant is important, although it was very far from obvious how its seed had been brought there. If it once gets a firm footing north of the Thames it must, judging from its abundance in the neighbourhood of Kew, become one of the commonest London weeds. Between the Adelaide Road and Belsize Park I have seen this season *Bromus secalinus*, *Chenopodium olidum*, and *Lathyrus Aphaca*. This last plant has also occurred this year on the site of the Exhibition, South Kensington, where *Medicago falcata* and *Centaurea amara* have also turned up for the first time. According to Dr. Boswell-Syme, all the *Centaurea Jacea* he has seen from the neighbourhood of London belongs to the form *amara*. The Exhibition ground has produced abundance of other forms of this plant, but I have not met with *amara* before.—W. T. THISELTON DYER.

R. plicatus, W. and N., occurs at Bishop's Wood, Hampstead, and is among the most interesting discoveries of Professor Areschoug, of Lund, during his visit this summer to England. Though not exactly the *R. plicatus* of northern England, there can be no doubt of the correctness of considering this form (which occurs also in Surrey) as one of those which the name *R. plicatus*, W. and N., comprehends. Professor Areschoug, with much acumen, at once separated this plant in its growing state from the neighbouring bushes of *R. cordifolius*, by contrasting its sepals, which are a light and almost vivid green externally, with those of the latter, which are a dull drab heavy green on their outer surface.—J. L. WARREN.

PHYTOLACCA ICOSANDRA, *L.*—In Nicaragua this plant springs up on newly-cleared ground; and on the banks of the river San Juan it is called "*Calalu*," and eaten instead of Spinach. I saw the men bring quantities of it, especially the top parts of the plant, on board the steamers, whenever they went on shore; and can endorse the opinion that *Calalu* is an excellent potherb. If I remember rightly, *P. icosandra* is cultivated in the vine-growing districts of Southern Germany on account of its black fruit, largely used for converting white wines into red.—BERTHOLD SEEMANN.

MONSTROSITY OF VIOLA SYLVATICA (p. 244).—Since I took a specimen of the crested *Viola* to Kew, I have been able to collect some curious facts on the same subject, which I think worth recording. From Mr. Wollaston I have received accounts of two other instances of crested *Viola* that have come under his notice. One grew in the garden of the late Mr. Swynfen Jervis, of Darlaston, Staffordshire, on the *corm of Filix-mas cristata*; the other in Mr. Wollaston's own garden, *very close to Polypodium vulgare v. cristatum*, but not actually on the plant. Here there are three instances, from Gloucestershire, Staffordshire, and Kent, of the *Viola* becoming crested when growing near crested Ferns. *Scolopendrium endivæfolium* was first raised at Mr. Young's, at Taunton. He asserted that it was a hybrid between a common *Scolopendrium* and an Endive growing together. I suppose no one would believe this, and he was far too good a botanist to believe it himself; but it may be another instance of a plant copying its neighbour. I was this week in the garden of Captain Jones, of Clifton. He rears a large number of Fern monstrosities, with which he is very successful. But I was surprised to find in his houses that the air is apparently so charged with monstrosities that even his normal plants acquire abnormal habits. Thus, his *Asplenium Nidus* has a bifid frond; the pinnules of his *Woodwardia radicans* are crested; and his *Blechnum australe* is sagittate. From all these facts, it seems very probable that contiguity has *some* influence on the forms of plants. The subject is a very interesting one, but I am too ignorant in the science of vegetable teratology to do more than record the facts.—HENRY N. ELLACOMBE.

CYSTOPTERIS FRAGILIS IN OXFORDSHIRE.—In July, this year, I found *Cystopteris fragilis* growing on the north wall of South Newington Church, near Banbury, in Oxfordshire. There might have been some twenty plants, for the most part small in size. The Vicar has since sent me the largest frond he could find, about six inches in length, which has been authenticated at the British Museum.—E. B. PENFOLD.

PLANTS NEAR BIRMINGHAM.—It may be interesting to record a new station for one or two of our rarer plants which I find in this neighbourhood. *Carex teretiuscula*, var. β. *Ehrhartiana*, I find growing on the borders of one of the pools at Sutton Park. In this same park, but about half a mile distant from the last, I find *Carex lævigata*, and just outside the park *Mentha rotundifolia* in the greatest abundance. If this last is an escape, I am puzzled to account for its presence in the meadow in question, as there is only one small garden anywhere near, and no trace of *Mentha rotundifolia* can I find in it.—JAMES BAGNALL.

PLANTS NEAR PLYMOUTH.—*Gnaphalium sylvaticum*, L., near Plymouth.—The author of the 'Cybele Britannica,' in vol. ii. speaks of this plant as "apparently very rare in the Peninsula" (Cornwall, Devon, and Somerset), and, in the Compendium, records it for Devon alone of the three counties of the province. So far as the neighbourhood of Plymouth is concerned, my experience confirms Mr. Watson's statements as to its great rarity in the south-west of England, since I never met with it anywhere here until recently, when I discovered it in two pastures enclosed from Crownhill Down, near Plympton. In one it grows plentifully, but in the other only sparingly. A few days after finding it in this locality, I was surprised at seeing three plants in another, Roborough Down, about six miles north of Plymouth. *Poa compressa*, L., in Cornwall.—This Grass is but thinly scattered over the country around Plymouth. One of its local stations is a dry bank about a mile from Torpoint, Cornwall, by the road leading thence to St. John's, by Trevol. It seems not to have been hitherto recorded from Cornwall. I take the opportunity of correcting two typographical errors in my article on "Plymouth Plants" in 'Journal of Botany,' Vol. IX. pp. 240–242; in second line, under *Pyrus torminalis*, for *base* read *bole;* in first line, under *Lastrea spinulosa*, for *most* read *moist.*—T. R. ARCHER BRIGGS.

ALISMA PLANTAGO.—If British botanists want occupation at this season of the year, a large field, comparatively unworked in England, lies open in the comparative anatomy of the subterranean and subaqueous parts of plants. The study of the life-history of the above common species, for example, would probably give new ideas on botany to many who are now mere collectors and systematists. Nolte has described and figured, in his essay on *Stratiotes* and *Sagittaria*, corm-like tubers, closely similar to those of the latter plant, in *Alisma*, which do not seem to have been observed, or at least properly understood in this country. Like those of *Sagittaria*, they are buds remaining dormant through the winter, and containing a store of nutriment, to be employed in the development of the new plant from the tuber in the next year.—HENRY TRIMEN.

Reports.

THE LOCAL FIELD CLUBS OF GREAT BRITAIN.

By James Britten, F.L.S.

VIII. The Woolhope Naturalists' Field Club.

This very important body was established in 1851 for the practical study of the natural history of Herefordshire and the adjoining districts; taking its name from the valley of Woolhope. At the date of the formation of the Club scarcely anything was known of the fauna or flora of the county, and for several years it confined its work to cataloguing the various natural productions of the district; the results of these observations being referred to in the successive annual addresses of the Presidents. The work already achieved by the Club is so important and so comprehensive, that it would be impossible to give any account of it in detail; the following observations are, therefore, merely descriptive of the botanical portion, it being remembered that almost every other branch of natural history has met with similar attention. For the particulars we are mainly indebted to Dr. Bull, of Hereford, a very energetic member of the Club, and one to whom it owes no small portion of its success.

The first botanical paper was read in 1853, by Flavell Edmunds, Esq., "On the Distribution and Causes of Colour in Plants;" the next was an important one, on "The Mistletoe in Herefordshire," by Dr. Bull, which has been printed *in extenso* in our pages,* and, therefore, requires no further remark. It was not, however, until 1866 that the Club came prominently into notice. In that year the first of the annual volumes of Transactions, to which it mainly owes its reputation, was issued. These volumes, occupying as they do a position midway between the more strictly scientific Transactions of the Tyneside Naturalists and the proceedings of such societies as the Manchester Field-Naturalists, are of considerable importance as favourable illustrations of "popular science;" while the local bearing of their contents renders them quite in keeping with the scope of a local society. They are so large, and so fully illustrated, that it is a matter of surprise how they can be produced at the cost stated in the balance sheet. The way in which this is managed is worthy of note, and may give a hint to other local clubs. In 1866 an arrangement was made with the proprietor of the 'Hereford Times,' which has a large circulation in the West of England, that the proceedings of the Club should be reported in full as ordinary news, and that the type employed for this purpose should be reset in octavo shape for the Transactions. In this way the proceedings were widely published, created great interest, and encouraged the study of natural history among the public throughout the district (thus fulfilling one great object of such a Club); and the Club had only to pay for the time occupied in resetting, etc., with such additions and illustrations as might be thought necessary. From this date an account of the proceedings was always published, in which all the papers read appeared at length; and, it being found that an ordinary reporter was scarcely equal to the task, the work was undertaken by Dr. Bull, who is also the able editor of the yearly volumes.

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* Journ. Bot. II. (1864) p. 361.

The botanical contributions to the annual volumes are as follow:—

1866.—"On the Plants of the Malvern Hills," by Edwin Lees, F.L.S. "On the Relative Value of the British Oaks," by the Rev. H. Cooper Key, M.A. "On Wandering Plants," by Dr. Bull; in which the appearance in Herefordshire of *Veronica Buxbaumii*, *Blitum virgatum*, and *Xanthium spinosum* was noticed. A coloured plate of the last-named plant (which appeared in luxuriance in the neighbourhood of Hereford for four years, in two of which it ripened a few seeds) illustrated this paper. "On Herefordshire Yew-trees," by the Rev. Thomas Woodhouse; illustrated by photographs of some of the more remarkable. This is the first of a series of papers on Herefordshire trees, which is still in course of continuation. "On Water Ranunculi," by Thomas Blashill, Esq. The most important publication of the year, however, was the first part of the "Flora of Herefordshire," by the Rev. W. H. Purchas. It consists of a description of the districts into which the county has been divided, with an excellent map; a sketch of the geology, by the Rev. W. Symonds, F.G.S.; and a tabular summary of the species found. The second part, containing details of the distribution of each species, is now in course of publication, and will be issued as soon as completed.

1867.—"Variations of Primula," by Flavell Edmunds, Esq. "On *Agaricus Georgii* and *A. campestris*," by Mrs. Key. "On Pruning Trees of neglected growth," by C. Wren Hoskyns, Esq., M.P. "On the Trees of Harewood and Pengethley." "On the British Oaks," by the Rev. H. Cooper Key, M.A. In this year was commenced a series of papers, "Illustrations of the Edible Fungi of Herefordshire," by Dr. Bull, with original drawings on stone, coloured by some ladies of the county. These illustrations have been continued from year to year, three coloured plates appearing in each volume. Although all the species noticed are more or less common, and the papers might therefore equally illustrate the Fungi of any other county, it is to them that the origin of the repute the Club has now attained in fungology may be mainly attributed. In 1868 Dr. Bull, representing the Club, took the first prize at the Royal Horticultural Society's show for the best collection of edible Fungi; and in the same year a special meeting, to be held once every season for a "foray among the funguses," was established. Among the new or rare Fungi found by members of the Club may be named *Agaricus (Entoloma) jubatus*, Fr.; *Lactarius controversus*, Pers.; *Hygrophorus calyptræformis*, B. and Br.; *Strobilomyces strobilaceus*, B.; *Pistillaria puberula*, B.; *Calocera cornea*, Fr.; *Hydnum erinaceum*, Bull.; *Cortinarius (Phlegmacium) russus*,* Fr.; *Scleroderma Geaster*, Fr., etc.

1868.—"The Elm-tree in Herefordshire," by Dr. Bull. "On *Cuscuta hassiaca*, L.," with a coloured plate, by Dr. Bull. "Our Native Food-producing Plants," by Thos. Blashill, Esq. "A Botanical Stroll in Herefordshire," by Mr. B. M. Watkins. "Why we should *not* eat Funguses," by the Rev. J. D. Latouche. "On the Spores of Fungi," by W. G. Smith, Esq. "New and Rare Fungi," by W. G. Smith, Esq. "Fairy Rings and their Fungi," by Edwin Lees, Esq. "The Remarkable Trees of Whitfield."

1869.—"The Mistletoe Oak and *Asarum* of Deerfold Forest," by Dr. Bull.† "Heywood Forest and its Funguses," by Dr. Bull. "*Clavis Agaricinorum*," by W. G. Smith, Esq.‡ "A Complete List of British

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* See Journ. Bot. VIII. 273. t. 110. † See Journ. Bot. VIII. 87 and 161.

‡ Journ. Bot. VIII. 137, etc., t. c.–cv.

Agarics," by W. G. Smith, Esq. "Discussion on Fairy Rings." "*Saponaria Vaccaria*," (with coloured plate,) by Dr. Bull.

1870.—"On the Reproduction and Growth of the Mistletoe," by the Rev. R. Blight. "On the Natural History of Aymestrey," (chiefly botany,) by the Rev. Thos. Woodhouse. "The Beech-tree in Herefordshire," by the Rev. Thos. Woodhouse. "The Mistletoe Oak of Llangattock Lingoed," by Dr. Bull. "On the more rare Plants of the Longmynds," by Dr. Griffith H. Griffiths. "On some curious Algæ only apparent in times of Drought, with notices of those that colour water in seasons of high temperature," by Edwin Lees, Esq. "Notes on Fairy Rings," by Prof. Buckman. "On the Larger Fungi of Trees," by W. G. Smith, Esq. "Additions to the List of British Agarics," by W. G. Smith, Esq. "On *Scleroderma Geaster*, Fr.," by C. E. Broome, Esq.* "The Autobiography of Fries," with portrait, translated by James Renny, Esq.

Many of the above papers are illustrated by coloured plates, and it may be observed that all other branches of science are equally well represented in the volumes. It is a practical testimony to the local estimation in which the Transactions are held that the earlier volumes have long been out of print, and it is now scarcely possible to obtain a complete set. If we might offer a hint, it would be that a larger edition of future volumes should be issued, so that those who would gladly purchase them—and they are many—may be enabled to do so. The President for this year is Thomas Cam, Esq., and the Hon. Secretary the Rev. Sir George H. Cornewall, Bart., M.A.

Extracts and Abstracts.

SUGGESTIONS ON FRUIT CLASSIFICATION.

By Alexander Dickson, M.D.,

Regius Professor of Botany in the University of Glasgow.

(*Read at the Meeting of the British Association, at Edinburgh, August* 8, 1871.)

Dr. Dickson referred to the confessedly unsatisfactory state of fruit-classification, and to the very unnecessary extent of the existing terminology, which is further complicated by a considerable amount of variance among botanists as to the precise application of several of the terms employed. He was of the opinion, which he believed to be a growing one among botanists, that the most convenient method of classification was, in the first place rigorously to restrict the definition of a "fruit" to the mature or ripe pistil, excluding from that definition those modifications of accessory parts or organs which, in many cases, are correlated therewith; and, secondly, to base the primary classification upon the general character of the modification undergone by the parts of the pistil in ripening, treating as of minor importance the characters involved in the description of the flower, such as the superior or inferior position of the ovary, etc.

The classification which Dr. Dickson suggests for the consideration of botanists approaches most nearly to that indicated by Schacht in his 'Grundriss,' of which, indeed, it may be viewed as a modification and expansion. Schacht grouped fruits under three heads:—1st. Capsular fruits, which dehisce to allow the seeds to escape; 2nd. Splitting fruits or schizocarps, which break into pieces, which do not allow the escape of the seeds; and 3rd. Fruits which neither dehisce nor fall into indehiscent pieces, including berries, drupes, and achenes. As this last group is very heterogeneous, Dr. Dickson prefers to consider berries, drupes, and achenes severally, as forms of equal value with capsules or schizocarps, and therefore would divide fruits into five groups, viz. Capsules, Schizocarps, Achenes, Berries, and Drupes, as will be seen in the following table:—

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* Journ. Bot. IX. 129. t. cxvi.

Classification of Fruits.

I. Capsule.—Dry, dehiscing to allow the seeds to escape.	Simple. [Probably the two forms included under this head should be embraced by a single term.]	1. *Follicle.* Dehiscing by one suture, usually the ventral, e. g. *Caltha*, *Magnolia*, etc.
		2. *Legume.* Dehiscing by both sutures, e. g. *Cytisus*, *Vicia*, etc.
	Compound.	3. (Name wanted.) Seeds escaping by longitudinal rupture of the wall of the capsule (dehiscence by valves, teeth, or pores), e. g. *Brassica*, *Viola*, *Rhododendron*, *Iris*, *Lychnis*, *Papaver*, *Campanula*, etc.
		4. *Pyxidium.* Seeds escaping by transverse rupture of the wall of the capsule (dehiscence circumscissile), *e. g.* from superior ovary, *Anagallis*, *Plantago*, *Hyoscyamus*, etc.; from inferior, *Bertholletia*, etc.
		5. *Regma.* Seeds escaping by rupture along the inner angles of the lobes, into which the fruit separates, e. g. *Geranium*, *Euphorbia*, etc.
II. Schizocarp.—Dry, breaking up into indehiscent pieces.	Breaking longitudinally into indehiscent cocci.	6. *Carcerulus.* Lobes not hanging from forked carpophore, e. g. *Tropæolum*, *Borago*, etc.
		7. *Cremocarp.* Lobes separating from below, and, for a time, hanging from extremities of forked carpophore, *e. g.* (from superior ovary) *Acer*, and (from inferior ovary) *Umbelliferæ*.
	Breaking transversely into one-seeded joints.	8. *Lomentum*, e. g. *Ornithopus*, etc.
	Breaking first longitudinally, then transversely.	9. (Name wanted), e. g. *Platystemon.*

III. Achene.—Dry, indehiscent, not breaking up. [Probably the names applied to the different forms should be abolished, and the term Achene applied to all.]	Superior.	10. *Achene* (in restricted sense). Pericarp not adherent to seed, e g. *Ranunculus, Rumex, Ulmus, Fraxinus*, etc. 11. *Caryopsis.* Pericarp adhering to seed, e. g. *Gramineæ.*
	Inferior.	12. *Cypsela.* Pericarp not much indurated, e. g. *Compositæ, Valerianaceæ*, etc. 13. *Glans.* Pericarp hard, e. g. *Quercus, Castanea, Fagus, Corylus*, etc.
IV. Berry.—Seeds imbedded in pulp. As a rule, indehiscent.	Outer portion of pericarp delicate (thin-skinned).	14. *Uva.* Superior, e. g. *Vitis, Solanum*, etc. 15. *Bacca* (in restricted sense). Inferior, e. g. *Ribes, Vaccinium*, etc.
	Outer portion of pericarp firm, leathery, or hard (thick-skinned).	16. *Amphisarca.* Superior, e.g. *Adansonia, Passiflora* [*Citrus* should be included here]. 17. *Pepo.* Inferior, e. g. *Cucurbita, Cucumis* [*Punica* should be included here].
V. Drupe.—Endocarp distinctly defined, and more or less indurated. Outer portion of pericarp of variable consistence, fleshy, leathery, or fibrous. As a rule, indehiscent.	One-stoned. [Probably the two forms included under this head should be embraced by a simple term.]	18. *Drupe* (in restricted sense). Superior, e.g. *Prunus, Cocos*, etc. 19. *Tryma.* Inferior, e. g. *Juglans, Viburnum*, etc.
	Two- or more-stoned. [Probably the two forms included under this head should be embraced by a single term.]	20. (Name wanted). Superior, e. g. *Ilex, Empetrum.* 21. *Pome.* Inferior, e. g. *Pyrus, Cratægus, Sambucus*, etc.
	With one plurilocular stone.	22. (Name wanted), e. g. *Cornus.*

As the modifications undergone by the fruit in ripening stand in direct relation to the dispersion of the parts by which the plant is disseminated, probably the most philosophical method of classifying fruits would be according to the nature of the parts disseminated. To carry out this principle rigorously, however, would lead to practical difficulties far outweighing any advantage gained. At the same time it is evident that the foregoing classification satisfies, in a general way, the conditions of such a method; thus—in Capsules and Berries, the *seeds*, as a rule, are the ultimate parts disseminated; in Drupes, the *stones;* in Schizocarps, the *mericarps* or *joints;* and in Achenes, *the fruits as wholes.* As refractory exceptions, however, may be mentioned those cases where the seed, *minus* its testa, is the part ultimately disseminated; for example—in *Oxalis* where, on dehiscence of the capsule, the elastic testa becomes ruptured, violently expelling the body of the seed with the tegmen; or in the so-called drupaceous seeds (*e. g.* in *Punica*), which are doubtless devoured by birds; and, after digestion of the pulpy testa, the body of the seed, with the hard tegmen, is evacuated, and dissemination occurs. Or, again, such a drupe as the Apple, where the induration of the endocarp is slight, we have the fruit behaving as a berry, and dissemination taking place by means of the seeds.

Some botanists may, perhaps, be surprised to note the omission of the terms *Siliqua* and *Silicula*, so universally employed to designate the fruits of *Cruciferæ.* A little reflection, however, is sufficient to make it evident that, if distinctions so trifling in character as those which separate these fruits from other valvular capsules were consistently carried out in practice, the terminology would become altogether intolerable. A similar argument may be adduced in favour of the suggestion made in the foregoing table, as to the propriety of devising some common term which will supersede those of *Follicle* and *Legume.*

New Publications.

Handbook of British Fungi; with full Descriptions of all the Species, and Illustrations of the Genera. By M. C. Cooke, M.A. London and New York. Macmillan and Co. 1871. Pp. 981; Figs. 408.

Since the publication of the fifth volume of the 'English Flora' in 1836, —the work of the Rev. M. J. Berkeley, which comprehended all the species that had been discovered in this country up to that time, and in which the characters, together with synonyms and references to figures, were of the most complete kind,—little has been done, in a systematic way, to enable botanists of moderate means to pursue the study of mycology. Without access to libraries such as that of Kew or the British Museum, a considerable outlay has been necessary to obtain the books containing the requisite information; many of these are very scarce, and the subjects treated of only in detached papers in the transactions of the learned societies of our own or other countries, and therefore inaccessible to the generality of students. The only work comprising all the species indigenous to Great Britain that has appeared since that time, viz. the 'Outlines of British Fungology,' by the author of the first-named work, was published in 1860, but it was so restricted by the publishers as to be of service only to those who possessed the works of Fries and other writers, so far as the more minute forms are concerned, since it contained specific characters of the larger species only, with short descriptions of the families, orders, and genera, accompanied by a list of the remaining species. During the eleven years that have elapsed since that period, numerous additions have been made to our Flora by a constantly increasing number of observers. It is therefore with great satisfaction that we can now announce the completion of the 'Handbook of British Fungi.' by Mr. M. C. Cooke, the well-known writer on the subject, in the issue of the second volume of his work. The author has deferred his introductory matter for the present, as the dimensions of the work have already far exceeded what was originally intended; we think he has also wisely avoided "encumbering his pages with a multitude of new generic names, often fanciful, seldom necessary, and which may, at best, be regarded as transitional." In the primary divisions of the Hymenomycetes he has adopted the latest views of Fries, with the additions and analytical key of Mr. W. G. Smith, first published in this Journal, which will be found of great use in referring each species to its proper position. In characterizing the families, orders, and genera, Mr. Cooke has combined the opinions of the Swedish mycologist, contained in the 'Monographia Hymenomycetum Sueciæ,' with those of the author of the Outlines, with the addition of synonyms and references to figures; and it may be here mentioned that the labour of those commencing the study of mycology will be considerably lessened by the characteristic woodcuts of each genus executed, we believe, expressly for the work by Mr. W. G. Smith, to whom the author is also indebted for numerous original observations. Another point now become essential to a correct description of a species has not been neglected by Mr. Cooke, viz. the measurements of spores, these he has given, wherever they were attainable, as well in fractions of an English inch as in millimetres, that again saving considerable time to the student in comparing specimens with French descriptions. The Myxogasters are considered to belong to the fungi, agreeably to the views of most botanists, and the Outlines followed in their arrangement. The work before us begins at this point to attain an increased value, as no specific characters of the subsequent species, except of a few of the larger Elvellacei, are given in the Outlines. The Sphæronemei are generally described as autonomous species, although doubts of their being truly such are thrown out; the state of our knowledge of these plants is not, however, sufficient to enable us, with few exceptions, to refer them to other genera with any degree of certainty. The author has here adopted the sound advice of Tulasne:—"Multi propterea tutiorem viam sequentur qui, deficiente debitæ, longæ scilicet, opportunæ et assiduæ observationis facultate, ea quæ seorsa seu discreta viderint, seorsim etiam, sicuti hactenus mos est, describent, nec dubia incertaque tentabunt conjugia." Favourable opportunities, time at our disposal, patient and repeated observations at various periods of the year, are requisite to form a correct opinion on these obscure affinities. But there can be little doubt that if any of these presumed genera are merely various modes of fruiting of one and the same species, the rule will hold good of them all, however difficult their identification may be. With regard to the Mucedines and Mucorini, it may be sufficient to state that the author follows the same course as with the former Orders, not entering on controverted questions. He has, however, made a step in advance by introducing the Saprolegnieæ provisionally amongst fungi. In the ascigerous section, Elvellacei, Tuberacei, etc., all the more recent information is given, which may be asserted with equal truth of the Sphæriacei, although it does not appear why the secondary forms of fruit, as described by Tulasne, are passed over in silence, as in the genera Ustulina, Nummularia, Eutypa, etc., nor why certain forms are attributed to more than one perfect species, as where *Hendersonia polycystis* is referred to *Diatrype lanciformis*, p. 436, and to *Massaria Argus*, at p. 844, it is an instance where Tulasne's advice might be of service. In this extensive Order, containing more than 30 genera and nearly 500 species, no attainable information had need be neglected, nor anything introduced that may tend to embarrass. Of the labours of other writers in this section of the fungi, copious use has been made, references to such papers as those of Mr. Currey in the Linnean Transactions are invaluable in a tribe where such distinctive characters may be found in the size and forms of the sporidia, and where access to authentic specimens is so difficult of attainment, very few herbaria in this country probably possessing the 'Scleromycetes Sueciæ' of Fries. With all this amount of matter, and the numerous illustrations and copious index, contained in the two volumes before us, the price to subscribers is only 10*s*. 6*d*., an amount very inadequate to cover the time and labour necessarily bestowed upon them, nor at all commensurate with the intrinsic value of the work. No one desirous of undertaking the study of mycology need now be deterred by the cost of books, or the difficulty of mastering the great divisions of the subject, the illustrations being quite sufficient to convey a general notion to the mere tyro. It is to be hoped that Mr. Cooke's work will find a place in every botanical library, and meet with the general appreciation among scientific men that it so richly deserves.

C. E. B.

Proceedings of Societies.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—EDINBURGH, 1871.

(*Concluded from page* 284.)

"On the Flora of Greenland," by Dr. Robert Brown. This paper consisted of (1.) A statement of the collection of Greenland plants from which our knowledge of the flora is derived, such as the collections of Vahl, Rink, Holböll, Obick (catalogued by Lange), his own collections in 1861 and 1867, the collections of the surgeons of whalers, etc. (2.) The results therefrom derived. The whole number of the Phanerogamia and Ferns is about 324 species and marked varieties. From a study of its flora from all available sources, he could only confirm and extend Dr. Hooker's conclusions from a study of the whole Arctic phyto-geography. It had many peculiarities, namely, the identity of the Greenland and Lapponian floras, the paucity of species, etc. Entering upon a consideration of Mr. Darwin's view, he considered that his doctrine of the Scandinavian flora being driven into all latitudes during the glacial period was abundantly confirmed. Discussing the subject of the transporting agents employed in disseminating Greenland plants, Dr. Brown considered that icebergs had but a small share in this work, for even allowing that they conveyed a considerable quantity of seeds in moraine, this moraine was in almost every case capsized into the sea and never reached the land. Migratory land birds had much more to do with it, and the winds no doubt carried the spores of Cryptogamia as well as the heavier seeds of Phanerogamia long distances. Speaking of the decrease of the species according to latitude, it was mentioned that in Smith's Sound only fifty-two species were found. *Cyperaceæ* was the largest Order. Plants sometimes reached under favourable circumstances as high as 4000 ft., though more frequently 2000 was the limit. The *Cassiope tetragona* and *Papaver nudicaule* were the hardiest. There was no connection between the present and pre-existing floras of Greenland. The Cryptogamic plants were much less known. Already 268 species of Lichens were described from Greenland, though many more were yet to be discovered, as Lauder Lindsay had found upwards of twenty species entirely new to science in his collection (Linn. Trans. 1870). *Umbilicaria* had the effect of giving an aspect to the scenery, but *Lecidea* had the largest number of species, viz., sixty-three. The Mosses known from Greenland were not many. Prof. Lawson, of Oxford, only found between forty and fifty species in Dr. Brown's collection, though doubtless many more were yet to be discovered. Only twenty-six *Hepaticæ* were yet known from Greenland. The *Algæ* described, number between forty and fifty, and left room for many new discoveries. The Fungi were few and the *Diatomaceæ* were little known.——Prof. Dickie remarked with regard to the *Algæ*, they were abundant not in species but in individuals. *Diatomaceæ* abounded; they largely composed a material obtained from cracks in the ice and resembling bread soaked in water, and they had also been obtained from the stomachs of mollusca. The land flora consisted of plants of the Scandinavian type, and these it was well known had the widest range of all plants.——Prof. Lawson thought that from birds sitting on icebergs there might be a greater deposit upon them; but the birds chiefly fed on fishes and would not necessarily bring seeds. The plants carried by icebergs would be chiefly Mosses and lower plants: these fall on glaciers from adjacent rocks and ultimately reach icebergs. The space examined in Greenland had been very small. The 270 plants chiefly represented a coast flora; of the vegetation of the interior, nothing was known. The Mosses from Greenland, principally belonging to the genus *Bryum*, were all common English forms. The collection was probably very imperfect.——Prof. Thiselton Dyer said that more exact information as to the carrying power of icebergs was much to be desired. Darwin stated that they had been known to carry brushwood ('Origin of Species,' 4th edition, p. 432), but he had never been able to ascertain the authority on which this statement rested.——Mr. Birkbeck Nevins had never seen in Hudson's Straits either land-birds, Mosses, or plants upon icebergs.——Dr. Brown, in reply, said that the transporting power of bergs had been much exaggerated. For flowering plants it was certainly small; as to Cryptogams it was different, since their spores might be carried considerable distances by the wind. Birds were the chief transporting agents of Arctic plants, all the passerine birds of Greenland were birds of passage.——Prof. A. Dickson, "Suggestions on Fruit Classification" [printed in full at p. 309],——Prof. Dickie objected to the treatment of drupes in the paper. The shallow groove in the fruits of the Plum, etc., was a very important point.——Prof. Balfour liked the primary divisions proposed. He was quite prepared to accept some improvement, but he thought that after all Professor Dickson had not reduced the number of names very materially.——Prof. Thiselton Dyer pointed out that fruit classifications had to be judged from two points of view. Writers on structural botany naturally desired a symmetrical classification; on the other, systematists would not use a cumbrous nomenclature. What was wanted was a compromise, a set of terms which would admit of satisfactory definition from a structural point of view, and which would be of practical use to those who described plants. It was absurd to go on loading our text-books with mere terms which taught nothing, and were never used.——Prof. Lawson thought that all terms found in books ought to be taught to students. If this were not done, they would be utterly at a loss when they came upon a term which had never been explained to them.——Prof. Perceval Wright said that manuals of botany were regarded as too little subject to change. They were very much open to improvement.——J. Birkbeck Nevins, "On the Development of the Vascular Tissue in Flowering Plants."——Neil Stewart, "An Inquiry into the Function of Colour in Plants, or into its Relationship to the Manner of their Illumination during Different Stages of their Development." The author read this paper, which was very long, in abstract. It was difficult to obtain a clear conception of his views. He was himself in doubt as to "whether he was deluded by a hobby, or hovering on the dawn of a new botanical philosophy." His notion seemed to be that the colour (and form) of flowers was controlled by advantage of the reflections of light from one part to another.——Dr. R. Brown, "On the Distribution of the Flora of North-west America." The chief point brought out in this paper was that, instead of one homogeneous flora to the north of Mexico and to the west of the Rocky Mountains, there were several. The chief of these were, (1.) The flora to the west of the Cascade and Sierra Nevada Mountains, and (2.) the flora to the east of that range and between it and the Rocky Mountains. There were various subdivisions, but these two were the chief ones. Then there was the Arctic flora by the shores of the Arctic Sea, and until you came south of the range of mountains which runs up the peninsula of Aliask, the Athabascan, or flora of the country to the immediate east of the Rocky Mountains, maintained its ground. There was an alpine flora of a similar nature on the Rocky and Cascade Mountains, though slightly varying according to the latitude. The whole north-west American is peculiar, and, as Oersted, of Copenhagen, pointed out, of a character almost insular. He differed from Dr. Asa Gray in thinking that there were few Japanese elements in the North-west American flora.

August 10th.—Excursion to Ben Ledi, under the guidance of Professor Balfour and Mr. Sadler. About 100 persons attended this excursion. Several alpine plants were noticed, e. g. *Thalictrum alpinum*, *Silene acaulis*, *Polystichum Lonchitis*, and *Hymenophyllum Wilsoni*.

SECTION E. GEOGRAPHY.—*August 3rd.*—Colonel Yule, C.B., presided.—Captain Miles, "On the Somâli Coast." The Exports from Bunder Murayah are frankincense, gum arabic, 'mulig,' indigo, and mats. Indigo grows wild, and is sent to Moculla and Sheher, where there is a great demand for it. The mats are made almost exclusively of the 'ow' or leaf of the Doum (*Hyphæne*) and wild Date Palms, the latter being preferred; they are dyed of two colours only, red and black; the red dye is a mixture of ashes, 'fooah,' saltpetre, and camel's dung, but they are acquainted with several plants that produce a red dye. 'Mulig,' or as the Somâl call it 'gero,' the fruit of the Doum Palm, is a nut with a hard and thick rind; it is cut in half, dried, and strung for export. The kernel is perfectly insipid, and requires an immense deal of mastication; it has nothing to recommend it, but is much eaten by the natives as a restorative. Asclepias, Senna, and Aloe plants grow abundantly, but their medicinal and fibrous uses are unknown to the natives. The most remarkable products of this country are its gums and resins. Gum arabic, tragacanth, myrrh, and many others are produced in abundance; and in no other country, except sparsely on the opposite coast of Arabia, does the Olibanum or Frankincense tree exist. The Somâl divide gum into two classes—sweet and bitter; and to the former belong gum arabic, mastic, 'luban,' mayeti, etc., and to the latter myrrh and 'hodthai.' There are, at least, three species of Acacia, producing the sumugh or gum arabic, and they are all very abundant; the bark is cut three times only by the natives for the gum to exude; if cut more frequently the tree dies. I was told that the tree is cut only in this and the neighbouring province of Wursum-Galli; in the west the gum is allowed to exude naturally. The 'hodthai' is a gum of peculiar quality; the tree is a thorny Acacia, not unlike the 'babool,' but has a thorny bark. The gum is not exported, and the only use it is put to, is by men, to whiten their shields, and by women to cleanse their hair. The tree producing the Olibanum or Frankincense, which is called by the Somâl 'Beyu,' grows only on the limestone ranges of this and the opposite coast. There are four different species of the tree, producing two different kinds of gum, bedwi or sheheri the best, and mayeti. Numbers of the Somâl go across to Hadhramaut, for the purpose of gathering the frankincense, paying the Arab tribes for the privilege, the latter never attempting to collect it themselves. The Somâlies never settle there, selling the gum at Moculla and Sheher, until they have amassed a competence. The Arab 'luban' is considered inferior to the African, which is termed 'asti' by the Arabs; probably the tree was imported into Arabia with the Myrrh-tree in very remote times. The mayeti is exported chiefly to Jiddah and the Yemen ports; the bedwi goes to Bombay for exportation into Europe. The season for gathering the gum lasts for four months—from May to September; the trees may be gashed any number of times without injury; but, unless rain falls soon after, the tree withers and dies. The gum is gathered fifteen days after the tree is cut, and it then ceases to exude, and the bark, which heals rapidly, is again gashed. The trees though growing wild are carefully watched by the Somâl, and in some cases I am told they plant and propagate saplings in their fields; but this laudable custom by which their wealth might be decupled is too laborious to be universally followed.——Mr. D. Hanbury observed that, as stated by Captain Miles, in ancient times frankincense was held to come from Arabia and from the adjacent coast of Africa; but with what almost seemed to be an unaccountable confusion, but which existed in all the books that had appeared on the subject in the latter part of the last century, and in the whole of the present up till within the last few years, they were taught to believe that frankincense was a product of India. It was very desirable to have information on that highly interesting subject. As to the different species of Gum-trees, their information was very poor; and with respect to myrrh, it was even more so. Much had been written as to Cinnamon, early authors holding that it was a product of Africa and Arabia. It was a very nice question, which required elucidation, whether the Cinnamon mentioned in Holy Writ was the product of Africa and Arabia, or whether it was merely carried thither from India, or from the still remoter regions of Siam and China by way of commerce, and whether in that way the idea was promulgated that it was produced in the land and districts from which it was shipped, by way of the Red Sea to Europe. In answer to a question Mr. Hanbury further mentioned that the common name in India of Cinnamon—'Dar-Chini'—seemed to indicate that it was originally obtained from China (*Cassia*), and not from Ceylon. Cinnamon and *Cassia* were anciently hardly distinguished. Cinnamon was indigenous to Ceylon, but the form which yielded the bark was a cultivated one.——Captain Elton, "The Limpopo Expedition." In the discussion it was stated that some interesting inferences as to the former physical features of this country had been deduced by Mr. Chapman from the mode of growth of the Baobab. It occurs in groves on little elevations in wide plains, which were once possibly lakes. The trees of each group are of about the same age, the oldest being highest up the country. It is possible that the seeds of the Baobab only germinate just a little above the level of the water. As the country became drained, each elevation, on its emergence, would be stocked with the Baobab by fruits floating down from the older and higher groves. Mr. Chapman measured one tree, 155 feet in circumference.——Dr. J. D. Hooker, C.B., F.R.S., "The Ascent of the Atlas Range." The account given in this paper was in substance the same as that already published in Dr. Hooker's letters to the 'Gardeners' Chronicle' [see numbers for May 27, June 10, June 17].——Dr. Cleghorn said that, like everything else done by Dr. Joseph Hooker, this investigation had been carefully and thoroughly carried out, and a great desideratum of botanical knowledge had been obtained. The absence of Primroses, Gentians, and Anemones was most remarkable. The observation on the exhausted condition of the forests was also noteworthy.

BOTANICAL SOCIETY OF EDINBURGH.—13*th July*.—Alexander Buchan, M.A., President, in the chair.—The following communications were read:—"Has Colour in Flowers a Function to Perform in the Fertilization of the Ovule?" By Mr. Neil Stewart. [A notice of this paper will be found in our report of the British Association (p. 316), where it was also read.] "Notes of Botanical Excursions made with Pupils in the Neighbourhood of Edinburgh." By Professor Balfour. June 7.—Melrose, Eildon Hills, and Rhymer's Glen. Among the plants collected were *Cryptogramme crispa*, *Valeriana dioica*, and *Cametina fœtida*. June 24.—Cupar and Leuchars. *Teesdalia nudicaulis*, *Cerastium arvense*, *Malva moschata*, *Helosciadium inundatum*, *Scrophularia vernalis*, *Trientalis europæa*, *Littorella lacustris*, *Listera cordata*, *Rhinanthus major*, etc. July 8.—Bridge of Allan and Stirling Castle Rock. *Calamintha Clinopodium*, *Paris quadrifolia*, *Neottia Nidus-avis*, *Equisetum umbrosum*, *Brassica campestris*, *Sedum album*, *Lactuca virosa*, *Silybum marianum*, *Atropa Belladonna*, *Verbascum Lychnitis*, *Aquilegia vulgaris*, etc.—Dr. John Lowe sent a note, with sketch, of the station for *Carex incurva*, near Prestonpans, where he collected it in large quantity in 1854.—Mr. Archibald Jerdon sent specimens of *Euphorbia dulcis*, L., which he had collected recently near Jedburgh. Professor Balfour stated that this plant, which was the *Euphorbia purpurata* of Thuillier, was collected by the late Dr. Graham among trees in an old neglected garden on the side of the Ochils, near Tullibody, and by Cruickshanks near Dumfries.—Mr. J. F. Duthie sent living plants of *Polygala austriaca* from Wye Downs, in Kent.—Mr. George Gordon presented a specimen of Cocoa-nut in which the three carpels forming the fruit are separate.—Senhor J. Correa de Mello San Paulo, Brazil, sent tubers of *Asterostigma Dracontium* (*Arum Dracontium*, Velloso, Fl. Flum. ix. t. 103). He states that it prefers to grow in virgin forests under the shade of large trees, in a soil formed of disintegrated granite covered with humus. The plant is known by the name of Jararaca, its petiole and scale being spotted like those of *Trigonocephalus Jarararaca*, which is called by the same name. He sent two varieties, viz. (1) *Porphyrosticta*, with the spots on the petiole, scape and spathe of a purple more or less vivid. (2.) *Chlorosticta*, with spots of a dull green hue.—Mr. J. Price presented specimens of a polypetalous form of *Erica Tetralix*, which he had collected near Ben Rhydding, in Yorkshire. —Mr. Wm. Evans exhibited specimens of *Cotula coronopifolia*, which he collected near Aberdour, Fife.

Botanical News.

Mr. Robert Cross, who has been collecting seeds and plants for the Government East India plantations, has once more gone to South America, this time, on his own account, to gather Chinchona bark as a commercial speculation. It would seem a pity that the services of so enterprising and daring a traveller should be lost to the East India plantations. Surely some remunerative situation could be found for one who has gathered, at the peril of his health and life, so much information invaluable to the cultivator. We are glad to see that the East India Office has published Mr. Cross's "Report on the Collecting of Seeds and Plants of the Chinchonas of Pitayo; "(printed for H.M. Stationery Office, 1871. 8vo. 52 pp., with three plates), from which it appears that the splendid Chinchona forests of Pitayo are fast disappearing. Little of this bark goes to England, the greater quantity to France and Germany, especially to France, "whose agents have nearly demolished forests which, if properly managed, would have paid off the national debt of New Granada." Mr. Cross is of opinion that the bark sold in England as Pitayo, "and for eighteen-pence a pound," does not come from the Pitayo district, as genuine Pitayo fetches nearly a shilling per pound on the spot. The three plates accompanying the report represent hieroglyphics, resembling those discovered by Seemann in Veraguas, and showing that the district was inhabited at a very early period.

On August 26th, at the advanced age of eighty-four, died James De Carle Sowerby, the eldest son of James Sowerby, well-known as the artist of the original figures of 'English Botany,' published in the years from 1790-1814. In his earlier years the late Mr. Sowerby was a devoted mineralogist, and especially studied the chemistry of minerals, the results of his investigations being published in his father's 'British Mineralogy' and 'Exotic Mineralogy.' He afterwards took up the subject of fossil conchology, and contributed various papers to the Royal, Linnean, and Geological Societies: from the last he received in 1840 the "Wollaston Fund" in aid of his studies. To the general public, however, he was best known from his connection with the Royal Botanic Society. When this was founded in 1839 Mr. Sowerby was appointed secretary, and he held the office till within a year or two of his death. He strove to render the Gardens useful as well as attractive; and teachers of botany in the medical schools of London have good reason to be grateful to him for the attention he paid to their wants, the main supply of illustrative specimens being derived from the Regent's Park Gardens. Mr. Sowerby inherited his father's artistic skill, and it is to his pencil that we owe most of the plates of the 'Supplement to English Botany.' He also wrote a few of the descriptions in vols. i. and ii. When this was commenced in 1829, Mr. Sowerby was connected with his brother, Mr. C. E. Sowerby, in the proprietorship. The death of the latter in 1843 brought the third volume to a premature close, but in conjunction with the late Mr. J. W. Salter, Mr. Sowerby brought out volume iv. and a fragment (six numbers) of volume v., the last part of which appeared so recently as June, 1865. The original drawings of all these plates, with the exception of those of the fifth volume, were in 1862 secured for the Botanical Department of the British Museum, which already possessed the drawings made for the original edition of 'English Botany,' by James Sowerby.

A great desideratum is shortly to be supplied. Considerable progress has, we hear, been made in the printing of a second edition of Pritzel's indispensable 'Thesaurus Literaturæ Botanicæ,' now twenty years old.

The vacancy in the Botanical Department of the British Museum, caused by the promotion of Mr. Carruthers, has been filled by the appointment of Mr. James Britten, late assistant in the Royal Herbarium, Kew.

We direct our readers' attention to the 'Herbier de la Flore Française,' by MM. Cusin and Ansberque, a magnificent work, illustrated with folio plates by a process of nature-printing. Seven volumes are printed, and it is expected that thirteen more will be required to complete the book. Mr. Hardwicke, 192, Piccadilly, the agent in this country, has copies of the published volumes, and will take subscribers' names.

Dr. Bretschneider, Physician to the Russian Legation at Pekin, has reprinted as a separate pamphlet his papers in the 'Christian Recorder' (a missionary journal) "On the Study and Value of Chinese Botanical Works." Though the author modestly says that he is neither a botanist nor a sinologue, his papers contain much valuable material for a history of the officinal and economic plants of China. The pamphlet is illustrated with facsimiles of eight rough but characteristic Chinese woodcuts from the Chi-wu-ming-shi-tú-kao, the most recent Chinese botanical treatise; a list of sixty-one books on the subject is added.

The garden of the Royal Horticultural Society at Chiswick, which it was feared would have to be entirely given up on the expiration of the lease, is to be maintained, though in a much contracted form. Only about one-third of the grounds are retained, including all the fruit-houses; the fine Arboretum, including many probably almost unique trees, and the wilderness have been given up. The portion now retained will no doubt be more satisfactorily kept up, the whole garden being beyond the Society's powers of support.

COMMUNICATIONS have been received from:—W. Carruthers, J. Renny, Dr. Braithwaite, Rev. E. B. Penfold, S. Kurz, W. Sowerby, J. Britten, Professor Thiselton Dyer, J. Bagnall, Rev. H. N. Ellacombe, Hon. J. L. Warren, etc.

Original Articles.

THE BOTANICAL HISTORY OF ANGUS.

By Mr. Robert Brown.

(*A Paper read before the Edinburgh Natural History Society on* 26*th January*, 1792.)

[This paper, which has never been printed, is of considerable value in itself, and will be read with the interest which always attaches to the early efforts of great men. Robert Brown was born on December 21st, 1773, so that he was but a little over eighteen when he read this essay. It is probable that it was his first contribution to botanical science, and that it is the paper alluded to in the obituary notice in the Proceedings of the Linnean Society (unhappily the only life we possess of the greatest of modern botanists), an addition to Lightfoot's 'Flora Scotica,' read in 1791. The excursion in Angus, which "did not exceed a fortnight," must have been made in that or a previous year. At this period Dr. Withering's 'Botanical Arrangement'—the second, and perhaps best, edition of which was completed in 1787 (except the 'Cryptogams,' which appeared in 1792)—was altogether the foremost text-book on British botany*;* and young Brown must be considered fortunate in having, soon after reading this paper, become a correspondent of the careful and excellent author. In the third edition (1796) we find the assistance of "Mr. Brown, surgeon, Edinburgh," acknowledged in the preface; and in the body of the book are a good many Scotch localities contributed by him, some being the same as those in this paper. We have been careful to print the communication just as it exists in the MS. volume of the Transactions of the Natural History Society, where it was found by Mr. Carruthers in August last.]

Mr. President,—In the following pages I do not pretend to give a full account of the vegetable productions of the county of Angus; but what I propose is only to enumerate some of its rarest plants, which I either met with myself or with regard to which I received credible information.

Before, however, entering upon this subject, it may not be improper briefly to point out the boundaries of this county and its relative situation with respect to other parts of Scotland. Angusshire, therefore, is bounded on the *south* by the Frith of Tay, which divides it from the county of Fife; on the east by the German Ocean; on the north it is separated from the county of Mearns by the river *North Esk*, and on the west it is bounded by part of Perthshire and of the Grampian Mountains, many of which it includes. To have minutely examined this tract of country, no less extensive than diversified in external appearance, would have required a length of time far greater than what I had to bestow on such an investigation; and when it is considered that the time I remained in that country did not exceed a fortnight, it will perhaps be thought presuming to attempt even a sketch of its botanical history. Conscious, therefore, of the numerous defects necessarily arising from this circumstance, I have not here proposed giving a full catalogue of its vegetable productions. Confining myself, as was before remarked, to those rarer plants only, which I can, either from an actual examination or authority in most cases unquestionable, safely mention as natives of Angus.

Before, however, we enter upon the investigation of the particular objects here to be treated of, it may not be amiss to observe that in different parts of this, as well as of every other country, even in situations almost perfectly similar, the plants produced are by no means the same; nor do we find that those which are common in one part of this kingdom are equally so in another. It may not be improper to illustrate this by a few examples relative to the present case. *Hypericum pulchrum* is far from being frequent in this neighbourhood, but it grows in most parts of Angus in the greatest profusion. Single specimens of the *Fucus esculentus* or *F. pinnatifidus* can hardly be met with on the seashores of this part of the kingdom. Both these plants, however, are so plentiful in the county alluded to, that the collecting and selling of them, especially of the former, afford even an almost constant employment for a particular class of the poorer sort of people.

Before prosecuting my subject I have only further to remark, that besides merely mentioning the plants as they occur, I shall, when it appears requisite, make a few observations on those whose Linnæan names do not yet seem sufficiently determined; not that in such cases I can pretend altogether to clear up the ambiguity, but principally with a view to the remarks of the ingenious members of this Society. I shall likewise add a few observations on such plants as are inserted in the 'Flora Scotica,' either from dubious authority or where no particular place of growth is mentioned.

I shall now proceed, therefore, to the enumeration proposed, taking the plants as they stand in the Linnæan system; beginning with the *Utricularia minor*, which grows plentifully in pools of stagnant water near Forfar. In other parts of Scotland this plant is very rarely to be met with; the only place mentioned in the 'Flora Scotica' is some peat pits near Kirkmichael in Dumfriesshire.

Schœnus Mariscus, which is not mentioned in the 'Flora Scotica,' grows in marshy ground north-east from Forfar. The spot in which it grows was formerly a small loch, which has lately been drained for the sake of its marle, and since that period the plant has never been observed in flower, but is in a very weak state.

Scirpus sylvaticus is likewise to be met with in this country in ground which is overflowed in the winter betwixt Brechin and Montrose.

Eriophorum alpinum, a plant hitherto unknown as a native of Britain, I observed near the same place with the *Schœnus Mariscus*. Within a mile of this place I likewise observed a species of *Agrostis*, which appeared considerably different from any of those commonly described as of British growth. It was then late in the season, and I did not find more than one specimen in flower. Afterwards, on comparing it with some grasses lately sent to the Botanic Garden here by Mr. Curtis, I found it exactly corresponding to his *Agrostis tenuifolia*. As, before I could do this, it was necessarily much later in the season, the plants were not in flower; but by the shape of the leaves from which the specific name *tenuifolia* has very aptly been taken, I could easily see the plants were perfectly similar. But till Mr. Curtis's plants flower, nothing can be said with certainty on the subject. At present I shall only add that, as I am very little acquainted with the 'Flora Londinensis,' I am not certain whether or not Mr. Curtis has as yet published any observations on this species.

Bromus secalinus grows in some cornfields several miles south from Forfar. In the 'Appendix to the Flora Scotica' it was mentioned to grow in similar situations behind the Botanic Garden, but I hardly think it will be found there now.

Scabiosa Columbaria was inserted in the 'Flora Scotica' on the authority of Sibbald, but no place of growth mentioned. It has been observed within a mile of Arbroath, in dry pastures.

Galium erectum, of Hudson, I was informed, had been found near Brechin, but the information cannot be altogether depended upon, as I saw no specimens. I thought, however, as it is not mentioned by Mr. Lightfoot, that this information was worthy of notice.

Lysimachia thyrsiflora grows in marshy ground beside the *Schœnus Mariscus*, and likewise in a similar situation betwixt Montrose and Brechin. This plant was not found by Mr. Lightfoot, nor has it, I believe, been observed by later travellers in North Britain.

Eryngium maritimum, or Sea Holly, grows plentifully on the sandy beach near Montrose, and in many other like situations on the coast.

Ligusticum scoticum was likewise observed, though very sparingly, on the coast betwixt Montrose and Arbroath.

Sium angustifolium I observed in ditches about Forfar. I do not mention this plant altogether on account of its scarcity, but because it has given rise to a mistake in the 'Flora Scotica.' This species itself is inserted in that work, and a description added which is very characteristic. But, on the authority of Mr. Yalden, the *S. latifolium* is mentioned in the appendix as a native of Scotland, and the only place of growth assigned is the King's Park. That the plant here called *S. latifolium* is nothing else than the real *S. angustifolium* there can be little doubt, for Mr. Yalden, in a catalogue which he has given of the plants in the King's Park, and which is published in the end of Mr. Lightfoot's work, mentions the *S. latifolium*, although it is well known that the *S. angustifolium* grows plentifully in that place, and, as far as I have observed, no other species of this genus.

Cicuta virosa is very plentiful in the ditches about Forfar, and in other parts of the country; but, although it is thus frequent, I never yet heard of its having been the cause of any fatal accident, although one of the most virulent poisons of the vegetable kingdom. In other parts of Britain it is providentially very scarce.

Linum Radiolum I likewise observed in wet ground in several parts of the country.

Drosera rotundifolia is a plant not unfrequently to be met with on marshy ground. According to Mr. Lightfoot, the *longifolia* is equally common in Scotland, but this is far from being really the case. It has of late been asserted that the leaves of the *Drosera* have the power, when a small body is applied to their upper surface, of contracting and enclosing the substance so applied, by this means in many cases proving a trap to those insects which happen to light upon them. The examination of this curious fact is certainly well worth the attention of the naturalist. In the second edition of Withering's 'Botanical Arrangement,' it is alleged that this phenomenon was observed immediately to follow the application of the substance. But it appears from works of a late German author that several hours generally elapsed before the leaf was completely folded together. The same author observes that when an insect is placed upon a leaf it naturally endeavours to escape, but is prevented by the viscid juice which is secreted by the long hairs on its upper surface. In a short time these hairs begin to be bent inwards, and gradually clasp the insect, which about this time is found dead, not so much in all probability from the pressure of the hairs, which cannot be great, but rather from the nature of the fluid which they exude. After the hairs have thus enclosed the animal the leaf itself begins to contract, and by very slow degrees at last covers its prey. Although I by no means pretend to deny the fact alleged by Dr. Withering, which was related from the actual experiment, yet I am rather inclined to give more credit to the German author's experiments. In a few trials which I made myself no contraction followed after a very considerable time, nor did I at all observe it. But it must be owned that as these were made with a pin instead of an insect, I cannot pretend to contradict the fact, but rather to blame the mode in which the trials were made. For it is well known to every one who has seen this plant in the growing state that many of its leaves are generally folded, and if these are opened there is always found some substance enclosed. If, therefore, the *Drosera* is endowed with such a power (and there is the strongest reason to believe it is), we will have some difficulty in accounting for it on principles merely mechanical. I now proceed with my enumeration.

Juncus articulatus, viviparus, I observed growing plentifully in wet ground near Forfar. In one case I saw the viviparous germen taking root, and in several instances these viviparous plants flowered when one half inch in height.

Arbutus Uva-ursi and *Epilobium alpinum.* Both grow on many of the Grampian Mountains.

Dianthus deltoides I likewise observed in several parts of Angus, and in one found a variety of it with a stem not divided as is generally the case, but simple, and supporting only one flower. Is it not probable that this or some other variety of the same species is the plant mentioned by Sibbald as growing on a hill near Perth, and inserted in the 'Flora Scotica' under the name of *Dianthus arenarius?* To satisfy myself concerning this I examined a hill in the vicinity of Perth (whether the same as that meant by Sibbald I am uncertain), and actually found the *Dianthus deltoides* and a variety with a white flower. I apprehend, therefore, that the *Dianthus arenarius* should be excluded from the 'Flora Scotica.'

Silene amœna, as it has commonly been called by the botanical writers of this island, grows plentifully along the coast. It is, however, very different from the plant so named by Linnæus, as evidently appears from comparing it with the specific character and short description which that author has given of his plant. It seems upon the whole very surprising that this name should have been applied to a plant so totally different in respect of characteristic distinctions, and almost impossible to assign any reason for such a conduct which has been almost universally adopted in this country. It should, however, appear by the 'Hortus Kewensis' that this plant is nothing else than the variety of the *Cucubalus Behen*, which grows on the seacoast, mentioned by the older botanical authors. But that it is more than a variety seems to me perfectly evident, as I have seen the plant cultivated without any alteration being produced. It even belongs to a different genus. But this will serve to show in a manner how artificial and with what impropriety the *Silene* and *Cucubalus* are separated, for in a strict propriety they only constitute along with the *Lychnis* one genus. But setting aside this last, it is evident that the two former might easily be joined without the least violence to the Linnæan system.

The *Cucubalus viscosus* was said to have been found on the coast near Montrose, but I suspect the *Silene nutans* has been mistaken for it, as is now found to have been the case in England. The *S. nutans* has, I believe, never been found in Scotland, at least it is not mentioned in the 'Flora Scotica.'

A species of *Arenaria* was observed on the Castlehill of Forfar, by Mr. Lightfoot, and by him thought to be the *A. laricifolia* of Linnæus. But from the figures referred to in the 'Flora Scotica,' it seems quite a different plant; but whatever it might have been, it is perhaps now lost to Scotland, as the greater part of the place on which it was said to grow has of late been cultivated, and the little that remains in its natural state I examined carefully, but without finding this or any such plant.

Sedum Telephium has been observed in some cornfields in the northern parts of this county.

Sedum anglicum, of Hudson, I observed on rocks near Dundee. It may not here be improper to remark, that there is at least some room to suppose this plant the *S. annuum* of Linnæus, as both authors refer to the same figure, viz. that given by Dillenius in Ray's 'Synopsis.' I should have been more confident in my assertion had I not observed that both plants are mentioned as growing in Kew Gardens. But I am even still inclined to think that some mistake has crept into the work in which this is to be seen, or if the plants are really distinct, it is evident that the synonyma have been misapplied.

Spergula saginoides grows in sandy ground near Forfar. This plant was called *S. laricina*, by Hudson and Lightfoot, and observed by the latter in the isle of Bute. It agrees perfectly well with the specific character either of the one or other of these plants.

Spiræa Filipendula grows on rocky ground near Dundee.

Turritis hirsuta is likeways to be found on several of the lower hills of Angusshire. I was likeways informed, from good authority, that the *T. glabra* had been found a few miles west from Montrose. This plant has never yet been found in Scotland, and is even very rare in England.

The variety of *Erodium cicutarium*, with a white flower, grows not uncommon on the seacoast. Perhaps it may be more than a variety, at least if it is only so, the differences are permanent and unalterable by cultivation. Although most authors have supposed these to arise from the influence of the sea. But as I have observed them unchangeable by culture I cannot accede to this opinion. Besides, I have frequently had occasion to see plants of this and of the common *E. cicutarium* growing side by side; and we may add to this, that the former is known to grow in the King's Park, a place which we may safely suppose to be altogether removed from the influence of the sea, and it may likewise be observed that in the place now mentioned the *E. cicutarium* does not grow. Upon the whole, this plant has certainly equal pretensions to a separate specific character from the *E. cicutarium*, as the *E. pimpinellifolium* of Mr. Curtis and others.

Orobus sylvaticus has been observed in some shady woods near Airly Castle.

Astragalus glycyphyllus I observed on the coast betwixt Montrose and Arbroath. A species of this genus which Hudson, and after him Mr. Lightfoot, have taken for the *A. arenarius*, of Linnæus, grows plentifully along the whole coast. It is now found to be widely different from that plant, but what its proper name should be seems not yet fully determined. Retzius, in his 'Observationes Botanicæ,' remarks that it is very nearly allied to the *Astragalus danicus*, but yet seems different. In the second edition of 'Withering's Botanical Arrangement,' this name is given it, but with some impropriety, as Retzius's plant is annual, while the plant found in this country is perennial. In the 'Hortus Kewensis' it has been called *Astragalus hypoglottis*, but it does by no means altogether correspond with the specific character which Linnæus has given to that species. Considering this diversity of opinion, I should be led to imagine that this plant is as yet undescribed, or if at all described, it is certainly but ill characterized, or distinguished from those to which it is most nearly allied. For it is certain that it very well expresses the specific characters of several species of *Astragalus*.

Trifolium medium grows by the sides of hedges in several parts of Angus. Concerning this plant likeways there has been a considerable diversity of opinion. In the first edition of the 'Flora Anglica' it is called the *Trifolium medium*, the name which it should still retain. In the second edition of the same work, and in the 'Flora Scotica' it has, however, been named *Trifolium alpestre*. Jacquin, in his 'Flora Austriaca,' has made it a new species, giving it the name of *Trifolium flexuosum*, which is adopted in the second edition of 'Withering's Botanical Arrangement.' But in a paper wrote by Afzelius, and published in the "Transactions of the Linnean Society," it is proved that the plant in question is nothing else than the *Trifolium medium* of Linnæus.

Hyoseris minima grows in several cornfields about Forfar. It was inserted in the 'Flora Scotica' on Sibbald's authority, but no place of growth mentioned.

I observed likeways a variety of the *Carduus Marianus*, with leaves altogether green, about a mile from Dundee.

Solidago cambrica was observed in the western parts of Angus. According to Lightfoot, it is only a variety of *Virga-aurea*, produced by the particular soil in which it grows. But since that period cultivation has ascertained them specifically distinct.

Doronicum Pardalianches grows in shady ground several miles west from Montrose. This plant has never yet been found in England, but was observed in Scotland by Mr. Lightfoot in some parts of Annandale; as he always found it near buildings, however, he concludes that it has probably escaped from gardens. But in the place which I now mention this could not possibly have happened; and I likeways met with it in Perthshire, in a situation which confirms me in this opinion; and besides, it may be remarked, that it is a plant very rarely, if ever, to be found in gardens, at least in this age. I would, therefore, upon the whole, suppose this plant to be an original native of this country; though it may be found in situations which may lead to the opinion of its having escaped from gardens.

Anthemis tinctoria was a few years ago observed in some cornfields about Forfar, but cannot now be found. It is not at all mentioned by Lightfoot, and is very scarce in England, nor is it in all probability an original native of this country, but has perhaps been imported with grain.

Sparganium natans grows in pools of stagnant water a mile east from Forfar. According to Hudson, it is a variety of his *Sparganium simplex*, but there can be little doubt that they are perfectly distinct species.

Carex limosa likeways grows near the same place. It is said in the 'Flora Scotica' to grow near Crief; but the figure referred to by Mr. Lightfoot evidently represents the *Carex panicea*, as has already been observed in the 'Botanical Arrangement.'

Salix arenaria, of Lightfoot, I observed plentifully in loose sandy ground near Montrose. It is, however, perfectly distinct from the plant so called by Linnæus, as appears from comparing it with that author's description. The *S. arenaria*, of Linnæus, is about the height of a man, but this plant is only about 10 inches in length and lies close to the ground. As we know the vast changes produced by a diversity of soil on this genus of plants, which have never yet been systematically arranged, I am not altogether certain whether this plant may not be a variety of the *S. repens*, but I am rather inclined to believe them specifically distinct.

I was informed that the *Equisetum hyemale* grows in the western part of Angus. It is inserted in the 'Flora Scotica,' but no place of growth mentioned.

Pilularia globulifera I observed in ground that is overflowed in the winter, near Belmont. It is likeways inserted by Mr. Lightfoot; but neither authority given nor place of growth mentioned.

With these remarks I beg leave to conclude my paper, which, it must be owned, in very few parts admits of discussion; on this account I should certainly not have presumed to lay it before the Society, had I not thought that the narration of facts of such especially as tend to illustrate in any degree the natural history of the country which we inhabit, was perfectly consonant with the views of this institution.

[The "authority," several times mentioned in the above essay, is doubtless George Don the elder. It is probable that he was Robert Brown's companion in some of his excursions. In Headrick's 'General View of the Agriculture of Angus' (1813), Don published an "account of the native plants" of the country; *Galium erectum* and *Turritis glabra* (see above) are both included in this list, and he there (p. 20) claims the discovery of *Eriophorum alpinum*, in 1791, for himself, adding that it was "the first and only time it has been found in Great Britain; he also mentions that *Schœnus Mariscus* formerly grew there, but does not mention *Lysimachia thyrsiflora*, which Brown collected with the others. This may perhaps indicate that the two botanists independently found species in the same year. In the British Museum herbarium, however, are specimens of the *Eriophorum* with a ticket in Brown's hand, running thus, "Shell Marle Moss of Restenet, a mile east of Forfar, July, 1793 . . . . R. Brown in company with George Don." This does not tally with Don's remark about "the first and only time;" and it is possible that the species was really collected by Brown and Don in company, in 1791, the date "1793" on Brown's ticket being an accident, due perhaps to having been written long after the date, as the writing seems to indicate.—H. T.]

FUNGI PARASITIC ON *VACCINIUM VITIS-IDÆA.*

By W. T. Thiselton Dyer, B.A., B.Sc.

Certain gall-like bodies occurring on *Rhododendron ferrugineum*, as to the origin of which opinions are somewhat divided, have recently been the subject of some discussion in the pages of the 'Gardener's Chronicle.' In the number for August 5, the Rev. M. J. Berkeley remarks in reference to them, "Mr. Broome has recently sent from Perthshire a thinner but similar substance on *Vaccinium Vitis-Idæa* covered with a similar bloom. There is no reason to suppose this is an insect product."

About the middle of the same month I met with plants of *Vaccinium Vitis-Idæa*, affected in the way described near the Trossachs, and therefore in the same county in which Mr. Broome also met with it. I submitted a specimen to Mr. Berkeley, who informed me that it was the result of "some species of *Ascomyces*, probably the same which accompanies or causes the gall-like bodies on *Rhododendron ferrugineum*." These he had already attributed (Gard. Chron., July 22, p. 944) to an *Ascomyces*, similar to that (*A. deformans*, Berk.) which produces blister in Peach-trees.

Happening to show a *Vaccinium* affected in this way to Dr. Ascherson, of Berlin, he at once identified it as the effect of a fungus, *Exobasidium Vaccinii*, Woronin, and informed me that it was frequently met with in Germany. In Rabenhorst's 'Fungi Europæi,' there are authentic specimens from Woronin, gathered near St. Petersburg. The fungus was, however, originally described by Fuckel in the 'Botanische Zeitung' for 1861, p. 251, and he figures (tab. x. t. 7) a portion of the affected *Vaccinium*, and also the spores. He gave it the name of *Fusidium Vaccinii*, and published specimens with that name in his 'Fungi Rhenani' (n. 221). I learn from Mr. Cooke that the same plant was collected a quarter of a century ago by Dr. Greville, and named in MS. *Cylindrosporium deformans*, but not described. In 1867, however, Woronin published an elaborate paper, illustrated with beautiful plates, contained in the fourth volume of the 'Berichte über die Verhandlungen der Naturforschenden Gesellschaft zu Freiburg im Breissgau,' (pp. 397–416, t. v. vi. vii.) in which he states (p. 400) that while entirely agreeing with Fuckel that the diseased state of the *Vaccinium* is produced by a parasitic fungus, and not through the punctures of insects, he considers the fungus to be altogether different from a true *Fusidium*. He also remarks that while Fuckel had met with the fungus on both *Vaccinium Vitis-Idæa* and *V. Myrtillus*, he has only succeeded in finding it on the first of these plants. Woronin represents in his figures the fungus as attacking, besides the leaves, the twigs (f. 11, 12, 13), and also the flowers (f. 16, 17, 18). The parts affected become much hypertrophied, of a pinkish-white colour, and with a flocculent-looking surface. In a microscopic examination of a section, the intervals between the cells are seen to be densely filled with a mycelium from which clavate cells (*basidia*) are protruded through the epidermal layer of the part of the plant affected. These *basidia* bear the spores on short stalks. As remarked by Woronin (l. c. p. 412) *Exobasidium* must necessarily be included amongst the *Hymenomycetes*. "It stands in the same relation to the *Hymenomycetes* (*Basidiomycetes*) as the genus *Exoascus* [*Ascomyces*] to the *Discomycetes* (*Ascomycetes*).* Fuckel only figures the spores, and did not observe the basidia from which they proceed; he therefore placed the fungus in a Hyphomycetal genus. He has, however, accepted Woronin's observations, and substituted *Exobasidium* in his 'Beitrage zur Kenntniss der Rheinischen Pilze,' p. 26, for the name under which he first described the species, and places it amongst the *Auricularini*.

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* There is an abstract of Woronin's paper in 'Hedwigia,' 1867, pp. 150, 151.

† *Fusidium tumescens*, Fckl. l. c. p. 371, Fungi Rh. 1653, which also occurs on *Vaccinium Vitis-Idæa*, may possibly belong to *Calyptospora Gœppertiana*, Kuhn.

The following are all the at present known localities for this plant; it probably only requires looking for to be found in many others. St. Petersburg (Woronin); North Germany, frequent (Rabenhorst, Fungi Europæi, sub n. 1384); Rhine Valley near Oestrich and Black Forest, not far from Friburg (Woronin); Scotland, Perthshire (Broome); Ballochbuie Forest, Braemar (E. M. Parkhurst).

Another fungus, *Calyptospora Gœppertiana*, Kuhn ('Hedwigia,' 1869, pp. 81, 82), affects the branches of *Vaccinium Vitis-Idæa* in a very curious way; Rabenhorst remarks that in the neighbourhood of Reichenhall (Bavaria), where it is found, the *Exobasidium*, so frequent in North Germany, appears to be absent. This has not been met with in Britain, but should be looked for.

In the Trossachs I also found a species of *Rhytisma*, parasitic upon *V. Vitis-Idæa*. This has not apparently been described, but it is in too immature a state to admit of determination. Provisionally it may be referred to *R. Andromedæ*, Fr.

FURTHER OBSERVATIONS ON PROTANDRY AND PROTOGYNY.

By Alfred W. Bennett, M.A., B.Sc., F.L.S.

I have been able to make a few more observations during the past summer and winter, on the relative period of the maturing of the male and female reproductive organs in continuation of those already published in the 'Journal of Botany' for October, 1870 (Vol. VIII. p. 315), which it may be worth while to record. The observations were made this year, in the latter part of August and early part of September, and in the southern counties of Cornwall, Devon, and Surrey. Not having my previous paper at hand, I noted down my observations independently, and only compared them subsequently. By far the majority of the species observed I find placed under the same head as last year; but the lines separating the three groups of Protandrous, Synacmic, and Protogynous flowers (to adopt the nomenclature then suggested) not being an absolute one, a few have passed over, as I should have expected would be the case, from a group to an adjoining one. Thus *Potentilla Tormentilla*, *Rubus fruticosus*, *Digitalis purpurea*, and *Euphrasia officinalis*, set down, in 1870, as synacmic, I find noted, in 1871, as protandrous; while, on the other hand, *Vicia Cracca*, *Circæa lutetiana*, and *Convolvulus sepium*, previously recorded as protandrous, are now thought to be synacmic. In two species only is there a still wider divergence in my observations than this—*Spiræa Ulmaria* and *Erythræa Centaurium*. The specimens examined of these plants last year were distinctly protogynous; while during the present year, on the other hand, the anthers appeared to reach maturity at a decidedly earlier period than the stigmas. It would be very interesting to know whether this discrepancy has been noticed by other observers in this or in other species. In *E. Centaurium* and its subspecies the stamens have a very peculiar habit of not surrounding the pistil, but, when they are discharging their pollen, the anthers being all collected together on one side of the stigmas. In *Spiræa Filipendula* the stamens themselves are so arranged as to favour cross-fertilization. The outer rows of stamens are matured first, and while they are discharging their pollen, the inner immature stamens are folded up into a kind of cap, completely covering up the stigma and preventing the access of pollen.

The following comprises all the additions I am able to make this year to the three lists :—

Protandrous.

Silene maritima.
Spiræa Filipendula.
Hedera Helix.
Centaurea nigra.
Serratula tinctoria.
Solidago Virgaurea.
Jasione montana
Melampyrum pratense.
Lysimachia nemorum.

Synacmic.

Hypericum pulchrum.
Galium palustre.
Hieracium umbellatum.
Convolvulus sepium.
Veronica Chamædrys.
Prunella vulgaris.
Galeopsis Tetrahit.

Protogynous.

Lonicera Periclymenum.
Plantago maritima.

In many *Compositæ* belonging to the suborder *Tubuliforeæ*, the anthers belonging to the perfect bisexual flowers of the disk, while protandrous as respects their own pistil, are developed at the same time as the stigmas of the female flowers of the ray.

I do not know whether it may have been noticed that in several species of *Convolvulaceæ* the stamens are normally of unequal lengths, as if indicating a structural approximation to the didynamous Orders *Labiatæ* or *Scrophularineæ*. In *Convolvulus arvensis* the filaments appear to be never quite equal in length. I almost invariably find two longer than the other three; the anthers of one of the longest frequently resting on the fork of the mature bifid stigma at the time that it is discharging its pollen. In *C. sepium* the filaments are usually of precisely the same length; but in *C. tricolor*, L. (*C. minor*, Hort.), and *Pharbitis hispida*, Chois. (*Convolvulus major*, Hort.), the inequality is quite as strongly marked. As is likely to occur in cultivated plants, the variation is in these cases subject to greater irregularity. In the former species I have sometimes noticed the difference in length to be quite as great as in most didynamous plants; in the latter species there appear often to be three distinct lengths, viz. two long, one medium, and two short.

ON *RUBUS RAMOSUS*, *Blox.*, AN UNDESCRIBED SPECIES OF THE NUDICAULIS GROUP.

By T. R. Archer Briggs.

Through the kindness of Mr. J. G. Baker, I have recently had the opportunity of comparing many of our Plymouth *Rubi* with named examples of foreign specimens in his herbarium from Genevier, Mercier, Wirtgen, and other Continental students of the genus. One comparison that I have made has been between the *Schlickumi* of Wirtgen and a well-marked English Bramble of the Rhamnifolii group, that some have supposed might prove identical with it, which has been named *ramosus* by the Rev. A. Bloxam, one of the greatest British authorities on *Rubi;* but which seems never to have been described, although common over a large tract of country around Plymouth.

I shall, in the first place, give a description of it, drawn up from a series of specimens in my own herbarium, collected in Devon and Cornwall; then say in what respects it differs frm *Schlickumi*, as represented in Mr. Baker's herbarium, as well as from *rhamnifolius*, W. and N.; and afterwards add a list of the localities where I have seen it growing. The following is the description :—

Stem erect-arcuate, rooting at the end, round or angular below, more angular towards the top, conspicuously furrowed, often purplish or shining in exposure, quite glabrous, or with very few inconspicuous silky hairs, no aciculi or setæ. Prickles scattered, confined to the angles, from a long compressed base, strong, sharp, patent or slightly declining. Leaves 5-nate, or here and there 3-nate and lobed. Leaflets often conspicuously convex above, not overlapping one another, shining, with a few scattered silky hairs, moderately pilose below, and sometimes white-felted also, coarsely serrate; terminal leaflet with a stalk at least one-third of its length, ovate or obovate, cuspidate, sometimes slightly cordate at the base; intermediate leaflets conspicuously stalked, obovate with narrow base, shortly cuspidate; basal very shortly stalked, narrowly ovate or obovate, with very short point; in the case of a 3-nate leaf the side leaflets are much lobed and dilated on the outer side; midribs with a few small hooked prickles; petioles with slight pubescence; stipules linear with silky hairs. Flowering shoot angular or furrowed, long, with short, not dense, silky hairs. Prickles few, short, hooked, those on the lower part of the shoot very small. Leaves mostly 3-nate; terminal leaflet obovate, shortly cuspidate, sometimes slightly cordate at the base; other leaflets ovate, with the outer sides much dilated and often conspicuously dentate or lobed, all irregularly serrate, especially towards the points, slightly pilose above, more so below, the upper ones of the panicle often white-felted also; veins prominent. Panicle sometimes compound, leafy below, of moderate length, top rounded, often flexuose or with waved rachis below, branches long with from 5 to 3 flowers near the top of each, two or three lower branches axillary sparingly pilose, the branches covered with ash-coloured felt. Prickles scattered, declining, sharp, very few near the top of the panicle and on the branches. Sepals ovate, with short linear points, rather sparingly pilose on the outside, white- or ashy-felted both within and without, reflexed. Petals broad, ovate, white or very light pink, nearly entire, sometimes notched at the end, claw very short. Filaments white. Styles dull brownish-pink. Fruit poor, irregularly formed, some of the drupes generally proving abortive.

From *Schlickumi* this plant differs by being less hairy generally, more especially on the flowering shoots, by having no aciculi or setæ, which are apparent both on the barren stem and panicle of the other, by having coarser and less regular serratures to its leaves, and by their points being cuspidate rather than acuminate. Its panicle is more corymbose at the top, its sepals broader, and without glands. *Schlickumi* has the sepals remarkably narrower, and scattered glands appear at the back. The dissimilarity of the two plants in general appearance is greater than the above-named points of difference would seem to imply, and I am not disposed to consider them the same thing; still I may be wrong in this opinion, as the specimens before me of *Schlickumi* are weak and poor, and so the comparison has not been altogether a satisfactory one.

From *R. rhamnifolius*, W. and N., it differs in having the barren stem less angular, leaves often convex above, with more glossy surface, both stem and panicle less prickly, especially the branches of the latter, some of these being without a single prickle throughout their whole length; also in having the panicle considerably more lax with the flowers at a greater distance from the rachis, especially near the top. The narrower base of the terminal leaflet of the leaves of the barren stem affords an additional mark for distinguishing it from the very broad cordate-leaved form of *R. rhamnifolius*, the *R. cordifolius* of W. and N.

I have never seen specimens, either fresh or dried, of *R. imbricatus*, Hort., so have no means of comparing it and *R. ramosus*, but judging from Professor Babington's description of it in 'British *Rubi*,' it must be very near the latter, although with the leaves imbricate, and those of the barren stem "opaque and pilose" above, it must differ somewhat from it. *R. ramosus* generally grows either in open or partially shaded spots in woods, as well as in thickets on their borders, and is much more of a woodland plant than is *R. rhamnifolius*.

In the tract of country watered by the Plym I have seen it between Stadiscombe and Plymstock; at Derraford, Leigham, in the woods of the Plym valley, and other places in the parish of Egg Buckland; in a lane between Elfordleigh and Newnham Park; near Bickleigh, etc.

In that drained by the Tavy:—between Knackersknowle and Tamerton Foliott; at Warleigh; Blaxton; near Maristowe; Denham Bridge; between Horrabridge and Tavistock, etc.

In that watered by the Yealm and Erme:—at Brixton Tor; Ivybridge, and in a moist bushy flat below Pen Beacon, on the southern border of Dartmoor. I have also seen it in a wood by the Tamar, close to Newbridge, on the Devon side of that river. In Cornwall I have met with it between Pillaton Village and Clapper Bridge, on the Lynher; as well as near Antony, on the road to Sheviocke; also in this county, at a considerable distance from Plymouth, between Looe and Morval; between the former place and Menheniot; and near Probus, only a few miles from Truro.

SHORT NOTES AND QUERIES.

AMBROSIA PERUVIANA, *Willd.*—Prof. Dyer's note (Journ. Bot. IX. 53) on this plant reminds me that I have had for some time in my herbarium a specimen of *Ambrosia maritima*, L., a native of South Europe and Asia Minor, which was found growing in abundance in 1865 in a cornfield at Ham, near Richmond, Surrey. I have placed the specimen in the British Museum herbarium. Last year I received *A. trifida*, L., a North American species, from the neighbourhood of Manchester.—JAMES BRITTEN.

THLASPI ALPESTRE IN THE LAKE DISTRICT.—The Rev. Augustin Ley supplies my want (p. 262) of an unexceptionable station for this species amongst the Lake hills proper by sending a specimen gathered by himself this autumn amongst the Helvellyn precipices at an elevation above sea-level of nearly 3000 feet. He has also met with *Pyrola secunda* above Thirlmere, presumably in the same places where it was found many years ago by Messrs. Watson and Woods.—J. G. Baker.

Right-handed *v.* Left-handed. — The question mooted by Mr. R. Tucker (Journ. Bot. IX. p. 216), whether a given twining plant should be called *dextrorsum* or *sinistrorsum volubilis*, is, when properly looked at, one of such extreme simplicity that it certainly ought not to have greatly exercised either mathematicians or botanists. De Candolle, whom Prof. Clerk Maxwell is stated to have accused of leading astray and perverting many unhappy naturalists in 1827, thus explains the matter in that year:—"On détermine la direction des tiges volubiles en supposant qu'on est soi-même placé au centre de la spirale, et que la tige tourne autour de son propre corps" (Organ. Vég. i. 156); and five years later he gave a similar explanation in his 'Physiologie Végétale" (ii. 840). But the best discussion of the point with which I am acquainted is by Schleiden, who states the case clearly and cogently in these words:—"I will here very briefly discuss the terms right and left-wound stem, in regard to which much confusion prevails. The natural conception is this: the plant is developed from below upward, consequently it ascends; if, now, we use the expressions left and right concerning the plant, this can only have a meaning when we place ourselves in its position; but we turn to the left in ascending if we have the axis of revolution to the left, to the right if we have it to the right. If we refer it to the course of the sun, we can evidently, in regard to our northern hemisphere, only bring the southern half of each revolution turned toward the sun into relation with its course, and then the right-wound spiral would go with the sun, the left-wound against it. Linnæus strangely used these terms in the opposite way, evidently starting from an obscure conception; and many others have followed him therein. Many have quite reversed the thing, called left right and right left, till the whole matter had become confused. The reference to the course of the sun is, moreover, a very imperfect mark. It appears to me, however, that left and right-wound cannot well be understood in any other way than that which I have given" (Princ. of Sc. Bot. 233). A screw is called "right-handed" in mechanics when a line touching the thread rises to the right (Golding Bird and Brooke, Elem. Nat. Phil. ed. 5, p. 102); but it is obvious that the movement of rotation of such a screw is to the left. If a hollow screw of this kind—say a common corkscrew—be blackened inside and then rotated round a white stick, the marks it leaves will rise from the left to the right of the experimenter, though the motion of the screw itself is to the left. In the same way, a person ascending a spiral staircase, the axis of which is on his left-hand, is always turning to the left, but he would pass from the left to the right of an observer stationed at the circumference of the staircase. Again, if the horses in a circus are riding round with their off legs toward the centre, they are going to the right; but, whilst traversing the semicircle nearest a spectator seated outside, they are passing to his left. The error of those who advocate and follow the Linnæan terminology is that, instead of describing the *actual* direction taken by the stem, they give the *apparent* one as seen by an observer standing without the spiral; thus, in fact, doing that with which, as I gather from Mr. Tucker's note, Prof. Maxwell reproaches his opponents, viz., representing the reflected image instead of the object. It is manifestly contrary to reason to employ, when speaking of the movements of a living plant, a terminology diametrically opposed to that made use of when alluding to those of an animal. Link (Elem. Phil. Bot. ed. 2. ii. 236), Choisy (in DC. Prod. ix. 321), A. de Jussieu (Cours. Élém. 138), Balfour (Class Book of Bot. 649), Henfrey (Elem. Course, 619), Payen (Élém. de Bot. 20), and Bentley (Man. of Bot. 107), follow De Candolle; St. Hilaire (Morphol. Vég. 103), A. Richard (Élém. de Bot. ed. 7. 90), Duchartre (Élém. de Bot. 127), and Le Maout and Decaisne (Traité Gén. de Bot. 13), use the Linnæan nomenclature. Prof. Lindley, in his 'Introduction to Botany' (ed. 4. ii. 378) interpreted the terms *dextrorsum* and *sinistrorsum* in De Candolle's sense; but in the glossary appended to the 'Elements of Botany,' he takes the other view of their meaning. Finally, in his elaborate memoir on climbing plants, published in the ninth volume of the 'Journal of the Linnæan Society,' Mr. Darwin, probably owing to the ambiguity with which these terms are surrounded, avoids both, and speaks of the twining as 'following' or 'moving against' the sun.—H. F. HANCE.

THE MARRAM OR MAT GRASS, *Psamma arenaria*, R. et S., is one of the best natural sand-binding plants we have. It is recorded that in the latter part of the last century, a large district on the eastern coast of Scotland was quite destroyed, and in the course of a few years became a complete desert by the advance of the sand from the shore, owing to the wanton destruction of the Marram that grew upon it. On many parts of the coast where this grass abounds, the country people make it into mats or twist it into ropes. On some parts of the Welsh coast the peasants plait it into mats which are used in churches, or into matting for covering rooms. Johnson relates, in his 'Mercurius Botanicus' (1641) that, in his time the manufacture of ropes, mats and similar articles from the Marram was the only handicraft known to the inhabitants of the village of New Anglesea.—J. R. JACKSON.

LYCOPODIUM CLAVATUM.—One would scarcely expect to find *Lycopodium clavatum* of much use as an economic plant, but besides the well-known application of its inflammable spores for producing artificial lightning, and its use by the chemist for rolling pills in to prevent them sticking together, the plant itself makes excellent doormats, and for this purpose it is largely collected in Sweden. The mats are very elastic and have this recommendation, that when dirty they can be very easily washed, upon which they recover their elasticity and dry readily.—J. R. JACKSON.

PANDANUS UTILIS.—The Mauritian sugar-bags, which, after being emptied of their contents in this country, are bought up, cleansed and transformed into small fish-bags or baskets, are mostly made of the leaves of *Pandanus utilis*. This species grows abundantly in the Mauritius, but owing to the trees being usually cut down every year they assume very different forms, frequently throwing out numerous small branches. Consequent upon the culture of the Sugar-cane in Queensland, this species of

Pandanus has been recommended for introduction into some of the numerous islands bordering the Queensland coast. The manufacture of the bags would open a new branch of industry in the colony. Mr. Hill, the director of the Brisbane Botanic Gardens, in advocating the cultivation of the plant says, "When an active demand shall arise in Queensland for sugar-bags we shall find that they are wanting, as also the material for their manufacture, unless no time be lost in rearing this valuable tree." Though the Mauritian sugar-bags are chiefly made from the leaves of this species, those of *P. odoratissimus* are also used, and it is not at all improbable that other species likewise lend their assistance. The leaves of *P. drupaceus* and of several others are used for thatching huts, and their stems for posts and supports to buildings. Indeed, in the Mascarene islands which, together with the islands of the Indian Archipelago, are the headquarters of the *Pandani*, they are most useful to the natives.—JOHN R. JACKSON, *Museum, Kew*.

WOLFFIA ARRHIZA.—I have visited the pond at Staines, where this grows, every year since 1866, and have observed each year that the struggle for life appears to be more and more to the advantage of the smallest inhabitant. *Lemna minor* seems to have departed, *L. polyrrhiza* to have great difficulty in holding its own, whilst little *Wolffia arrhiza* has secured one corner of the pond entirely to itself. I send you a boxful just as when taken from the water.—E. C. WHITE.

DRABA RUPESTRIS, *R. Br.*, IN IRELAND.—Seeing Dr. Moore's notice of the appearance of *Draba rupestris* on Ben Bulben, Sligo, I think the following narrative may be of interest. In August, 1869, I visited Ben Bulben, and brought away a number of living plants of various species. Amongst these was a *Blechnum*, gathered on the gentle slope of the northern base of the mountain. On reaching home I potted it, and last year I perceived a small plant springing from the soil, which I allowed to grow. In the early spring of this year it commenced to flower, and I found that it was a *Draba;* and, knowing that *D. incana* was common on the Sligo mountains, I concluded that it must be that species. As its growth matured I found that the pods were not twisted, and that it could not be *D. incana*, but must be *D. rupestris*, a plant hitherto excluded from the 'Irish Flora,' or recorded with a doubt attached to it. The earth used in potting the *Blechnum* was fresh peat from Bedfordshire, mixed with white sand from this neighbourhood, neither of which could have contained the seed which had germinated, and which must have been brought in the soil attached to the root of the Fern from Ben Bulben. I have dried the plant, and forwarded it to the Professor of Botany, Trinity College, Dublin, to be placed in the herbarium of the Dublin University.—W. M. HIND.

PERSICARIA BIFORME, *Fr.*—I find that in stating (p. 35) that authentic specimens of this plant in the Kew Herbarium have ochreæ without cilia, I was in error. Another opportunity, with better light, allowed me to ascertain that they are in reality sparingly ciliate. Except for the sake of accuracy, the correction is of no great importance.—W. T. THISELTON DYER.

FRUIT OF VINCA.—The following passage from Blair's 'Botanical Essays' (1720), pp. 10, 11, is a sort of answer to Mr. Grindon's query (p. 14):—"*Vinca pervinca*, or *Clematis daphnoides*, flowers plentifully every year, but never produces the pod or seed-vessels in its native soil, especially in these colder climates; because most of its nourishment is spent in sending forth abundance of new twigs and leaves, by which it overspreads the whole ground; but if it be put into a pot, and all its stolons or shoots be taken off, but one or two of the strongest, then it will produce the pod or seed-vessel, which shall contain seed till it ripen, according to the observation of Dr. Morison and Dr. Tournefort." Ray also notices the rarity of its fruiting (Methodus Plant. p. 3, 1682).—W. T. THISELTON DYER.

BROMUS RAMOSUS, *Huds.*—Without disputing the distinctness of the ordinary British form from the possibly not indigenous *B. asper*, L., of Beneken, it is as well to point out, by way of warning, that the restriction in our English plant of the number of lowest branches of the panicle to two is not an absolute diagnostic character. In Hooker's 'Student's Flora' they are described as 2–3-nate; and Dr. Boswell-Syme pointed out to me in his garden at Balmuto a cultivated tuft of the grass, in which this was very conspicuously shown, near Linlithgow. I also met this summer with a plant in which there were *four* branches at the base of the panicles, but agreeing in other characters with ordinary *ramosus*.—W. T. THISELTON DYER.

I have several times noticed one common form with more than two branches at the lowest semi-verticil. A plant which I collected at Winchester this autumn had three branches, and Mr. Warren has sent me specimens from near Shrewsbury with the same number. As I pointed out at p. 270, it is by the coexistence of several characters that the plants are distinguished; probably the relative length of the awns and paleæ, and of the two glumes, are the best single characters. Dr. Ascheron, of Berlin, informs me that the restricted *B. asper* of Beneken is really the common form in many parts of Germany, though so scarce in more western Europe.—HENRY TRIMEN.

Extracts and Abstracts.

TEMPERATURE OF FUNGI.

Last week I met with a number of specimens of the Giant Puff-ball, *Lycoperdon giganteum*, while making one of my usual weekly class excursions in the neighbourhood of Cirencester. Two of them were selected, a large and a small one, for museum specimens, while a portion of a very large one was placed by me in my botanical box. Next morning, on opening the box, I found the contents sensibly warm to the hand, and had no difficulty in tracing the effect to its cause. The portion of Fungus was quite warm, and had communicated part of its warmth to the other plants in the box. Unfortunately, no thermometer was at hand at the time, or a careful reading of the temperature would have been made. The smaller specimen of the Puff-ball, weighing 1 lb., was taken, and placed in a box, where it remained all night. Next morning, two readings of the thermometer were made at 8.45 A.M. The temperature was again observed at 10.30 A.M. and 11.15 A.M.

	8.45 A.M.		10.30 A.M.	11.15 A.M.
	1.	2.		
Temperature of Fungus . .	12·2°	12·4°	12·4°	12·2°
Temperature of Air . . .	11·1°	11·2°	11·6°	12·0°
Difference	1·1°	1·2°	0·8°	0·2°

Next morning two readings were taken at 9.10 A.M., the Fungus being warmer than the surrounding atmosphere.

	9.10 A.M.	
	1.	2.
Temperature of Fungus	11·4°	11·5°
Temperature of Air	10·5°	10·6°
Difference	0·9°	0·9°

On the next morning the Fungus was found to be drying up, and the observed temperature was only 0·2° higher than that of the surrounding air. The air outside the box, 11·4°; inside the box, 11·4°; temperature of Fungus, 11·6°. No further observations were made.

A. de Bary mentions (Hoffmeister, 'Handbuch der Physiologischen Botanik,' vol. ii. pt. 1. p. 228) that the temperature has been observed by Dutrochet in five Fungi belonging to the genera *Agaricus*, *Boletus*, and *Lycoperdon*. He, however, was only able to observe an increase of from 0·10° C. to 0·45° C. The greatest increase in my specimen was noticed on the first morning of the observations, at 8.45 A.M., namely 1·2° C.

The greatest temperature is evidently produced during the night, as the difference between the temperature of the Fungus and air rapidly diminished, so that at 11.15 A.M. the difference was only 0·2° C.

The difference between the morning temperatures on the first and second day of the observations—1·2° and 0·9°—can be easily accounted for by loss from conduction, etc., but chiefly from the loss of heat caused by the evaporation of water, the weight of the Fungus having decreased from 16 oz. to 13½ oz. during the three days the experiments lasted.

The cause of the increase of temperature is due to the oxidation of the nutrient materials in the Fungus, a process depending on the absorption of oxygen, which acts on these nutrient materials, and causes various metamorphoses, an equivalent quantity of carbon dioxide being liberated. This metamorphosis of nutrient or assimilated materials goes on in all plants in daylight as well as in darkness, and is also associated with the taking up of oxygen and liberation of carbon dioxide, a process which is now recognized by all Continental physiologists as the true respiration of plants. In *Spirogyra* we can, during the day, observe the formation of assimilated materials as starch in the cells, which contain chlorophyll. During the night the assimilated material is metamorphosed or elaborated, and the cell divides and converts the assimilated material, after it has been metamorphosed, into cellulose and protoplasmic substance. In Fungi the nutrient materials are probably taken up only during the day, and during the night metamorphosis, or elaboration of these materials, takes place. Heat is the result of the oxygenation, and, from the energy of the process and size of the plant, the elevation of the temperature is very marked. All the temperatures are given in degrees Centigrade, and, as the temperatures were always carefully observed by Professor Church, the accuracy of the readings may be depended on.—Dr. MACNAB, *in Gardeners' Chronicle, Sept.* 30, 1871.

OBSERVATIONS ON THE GLACIAL ORIGIN OF THE PEAT-BOGS OF THE JURA AND THE SPECIAL VEGETATION THAT CHARACTERIZES THEM.*

BY PROFESSOR CHARLES MARTENS.

The first requisite for the formation of a peat-bog is an impermeable foundation which water does not penetrate. The configuration of the surface plays only a secondary part; thus peat-bogs are found in flat countries like the borders of the Somme, Ems, and Weser, in Schleswig-Holstein and Holland, as well as in the valleys of the Vosges, Jura, and Scotch mountains; sometimes even they establish themselves in slight depressions of steeply-inclined slopes. Besides this, rains should not be too uncommon, the air must be habitually humid, and the heat of summer not too great. In Europe they extend from Spitzbergen to the Pyrenees and the North of Italy, but do not pass further south. In the Jura the obstacle which prevents the downward passage of water into the lower strata, is a bed of glacial mud derived from the trituration of the primitive felspathic, aluminaceous, and siliceous beds; at the epoch of the great extension of the glaciers of the Alps the Jura was invaded by them, being included within the domain of the great glacier of the Rhone. In spite of the destruction of a great many of them, the erratic blocks which it laid down are still very numerous. The Jurassic peat-mosses have then a glacial origin, even when they are not barred by a moraine. Suppress the moraine as a barricade in a great number of cases, suppress the glacial mud which makes the foundation impermeable, and the peat-moss would not be formed, and it is the same with those that are found beyond the range of the mountain-chains in Piedmont and the north of Switzerland.

The following are the principal plants of these peat-mosses :—

Trees.—Betula pubescens (a variety of *alba*), Pinus uliginosa, *Neum.* (which is a mere variety of *montana*), Abies excelsa, et Sorbus Aucuparia (the two latter comparatively rare).

Shrubs.—Betula nana, Salix aurita, S. repens, S. ambigua, S. cinerea, S. rubra, et Lonicera cærulea (the three last comparatively rare).

Undershrubs.—Andromeda polifolia, Calluna vulgaris, Vaccinium uliginosum, V. Myrtillus, V. Oxycoccus, V. Vitis-Idæa, Empetrum nigrum.

Herbaceous Plants characteristic of the Peat-bogs.—Scirpus cæspitosus, Saxifraga Hirculus, Eriophorum vaginatum, E. angustifolium, E. latifolium, E. alpinum, Carex pauciflora, C. chodorhiza, C. heleonastes, C. teretiuscula, C. limosa, C. filiformis, Drosera rotundifolia, D. longifolia, Parnassia palustris, Pinguicula vulgaris, Galium uliginosum, G. palustre, G. boreale, Stellaria uliginosa, Pedicularis palustris, Viola palustris, Scheuchzeria palustris, Sagina nodosa, Swertia perennis, et Aspidium spinulosum.

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* Montpellier: Boehm et fils. 1871. Pp. 34. 4to.

Aquatics of the neighbouring Swamps and Ditches.—Ranunculus Flammula, Caltha palustris, Nasturtium amphibium, Bidens cernua, Carduus palustris, Epilobium palustre, E. angustifolium, Comarum palustre, Myosotis palustris, M. cæspitosa, Utricularia vulgaris, U. minor, Mentha aquatica, Veronica scutellata, Menyanthes trifoliata, Polygonum Persicaria, Glyceria fluitans, Catabrosa aquatica, Sparganium natans, Juncus alpinus, J. conglomeratus, Potamogeton rufescens, P. pusillus, P. natans, Rhynchospora alba, Carex stellulata, C. panicea, C. Œderi, C. ampullacea, et Equisetum palustre.

Herbaceous Plants of the surrounding Grass.—Ranunculus repens, Trollius europæus, Cardamine pratensis, Lychnis Flos-cuculi, Stellaria graminea, Ægopodium Podagraria, Scabiosa succisa, Solidago Virgaurea, Cineraria spathulæfolia, Bidens cernua, Sanguisorba officinalis, Spiræa Ulmaria, S. Filipendula, Scrophularia nodosa, Polygonum Bistorta, Phleum pratense, Alopecurus pratensis, Calamagrostis lanceolata, Aira cæspitosa, Agrostis canina, Festuca ovina, Blysmus compressus, Carex Davalliana, C. pulicaris, C. canescens.

Plants of Dry Turf.—Viola tricolor, Chrysanthemum Leucanthemum, Hieracium Auricula, Alchemilla vulgaris, Potentilla Tormentilla, P. anserina, Euphrasia officinalis, Thymus Serpyllum, Melampyrum arvense (*pratense* no doubt intended), Linaria vulgaris, Gentiana campestris, Rumex Acetosella, Agrostis rubra, Molinia cærulea.

Mosses.—Sphagnum cuspidatum, S. acutifolium, S. cymbifolium, S. tenellum, S. compactum, S. subsecundum, Hypnum fluitans, H. trifarium, H. revolvens, H. scorpioides, H. exannulatum, H. stramineum, H. cordifolium, H. stellatum, H. nitens, H. splendens, H. Schreberi, H. Crista-castrensis, H. cuspidatum, Aulacomnium palustre, Meesia longiseta, M. tristicha, M. uliginosa, Polytrichum commune, P. formosum, P. gracile, P. piliferum, P. urnigerum, Dicranum Schraderi, D. glaucum, D. cerviculatum, D. undulatum, D. scoparium, D. palustre, Campylopus torfaceus, Splachnum ampullaceum, S. sphæricum, Paludella squarrosa, Bartramia fontana, B. marchica, Bryum nutans, B. pseudo-triquetrum, B. argenteum, B. bimum, Climacium dendroides, Mnium punctatum, M. affine, Atrichum undulatum, Ceratodon purpureus, et Funaria hygrometrica.

Lichens.— Cladonia rangiferina, C. subulata, Lecidea icmadophila, L. uliginosa, Cenomyce pyxidata, C. coccifera, C. bacillaris, C. deformis, et C. gracilis.

The floras, as we have them at present, are not all equally ancient. They mount up to epochs more or less remote and different. Thus the Mediterranean flora goes back to the Miocene epoch. It possesses, in fact, existing species which have been found fossil in the Tertiary strata by M. Saporta and other observers. Certain remarkable species, like the Dwarf Palm, the Laurel, the Fig, the Olive, the Carob, the Pomegranate, the Myrtle, *Anagyris fœtida*, *Cneorum tricoccum*, *Nerium Oleander*, *Smilax aspera*, have not yet been reported from the Eocene or Miocene beds, but their affinities point clearly to an origin at an epoch when the Mediterranean basin had a climate much more tropical than is the case now. The flora of the Jurassic turf-bogs is of a more recent date. Its boreal character and the nature of the soil that supports it, shows clearly that it is Pliocene and contemporary with the glacial era. The opinion of the geologists and botanists who suppose that at this era the vegetation of the regions of the globe which were invaded by the ice was absolutely null, does not appear to me well founded. In fact, the glacial epoch exists still at the two poles. Round the Arctic pole, Greenland, Spitzbergen, and Nova Zembla, are covered with masses of ice, of which the branches stretch down to the sea, but still they have plants growing in the intervals which the ice does not cover. In Spitzbergen there are 93 Phanerogamia; in Greenland, 328. Robert Brown, who visited the Bay of Disco, in 70° N. lat., collected 129 species there in the course of a single summer. These plants are not all special to the Arctic region, but many spread out towards the south; and, if we glance over the catalogue of these plants of the Jurassic turf-bogs, we find out of a total of 179 species, 73 are actually Arctic at the present day; besides these, there are 106 species not now found in the Arctic regions, but all of them, except *Swertia*, are Scandinavian. Now, when we remember that the Neufchatelois Jura is 23° of latitude south of Lapland, is it absurd to suppose that at the glacial epoch its climate was not more rigorous than that of Lapland is now, and that these Scandinavian species, of which the centre of creation is still to determine, existed also at the epoch when the alpine glaciers overtopped the Jurassic ridges? I have elsewhere made the calculation that if the mean temperature of Geneva were lowered four degrees Centigrade, the glaciers of the Alps would again invade the basin of the Leman. If this were the case, the temperature of the Jurassic valleys would still be higher than that of Altenfiord, in 70° N. lat., where most of the species grow which we find now in the Jurassic peat-bogs. The plants have persisted in the Jura in spite of a warming of the climate, amounting to four degrees, because they have found in the constitution and humidity of the soil, conditions of existence analogous to those with which they are surrounded in Lapland at the present day.

Another proof that the climate of the glacial epoch, during which the erratic blocks of the Jura were laid down, was not rigorous enough to exclude all vegetation, is found in the fact that man inhabited the basin of the Leman, and that of the lakes of Zurich and Constance, immediately after the glacial epoch at Vierier, Meilen, and Schussenried, where we find worked flints and reindeer bones in the alluvium of the terraces just above the glacial beds. But if, as I have always believed, the old alluvium of Switzerland is contemporaneous with the same deposit in the plains of France, where incontestable proofs of the existence of man have been obtained, I do not despair of hearing that the Swiss geologists have found human bones and worked flints either in the midst of the glacial beds or even in the old alluvium on which they rest.

But to return to our plants. By the area of their geographical distribution, they furnish us with an argument which is not without value. Spread through northern Europe, many of them stop at the Pyrenees and Alps. In North America they stop generally at the fortieth degree of latitude. Now these are the extreme limits of the great extension of glaciers of which the Arctic pole and the great European mountain-chains, situated at the north of 42°, were the principal centres. The plants, therefore, grow now in the very regions then invaded by the glaciers.

We may say, perhaps, that the vegetation of the Jurassic turf-bogs, is not an exceptional vegetation in this chain of mountains, and if it be exclusively Scandinavian, that of the whole Jurassic flora is equally so. But in answer to this objection, read the list in Thurmann's 'Essai Phytostatique of the characteristic mountainous plants of the chain; of these, there are 142 species mentioned, out of which only 66 exist also in Scandinavia. The presence of these Arctic species in the Jurassic turf-bogs, is then a confirmation of the opinion that they existed in the Jura at the glacial era. All, in fact, can support a temperature lower than that of the Jurassic peaks, for all ascend higher in the Alps, and they can accommodate themselves to a more temperate climate, for I have gathered them nearly all in the north of Norway at the sea-level. Another consequence of these facts is, that the vegetation of all the peat-mosses of the plains of northern Europe, of the Vosges, the hills of Auvergne, the Alps from France to Austria, and even of the Pyrenees has the same origin. For long botanists have been struck with the uniformity of their vegetation, and attributed it to a similarity of physical conditions. This explains why the plants stay there, but it does not explain why we always get the same species over a space equal to a quarter of the area of the whole terrestrial globe. Identity of origin can alone explain this identity of vegetable forms.

New Publications.

The Lichen-Flora of Great Britain, Ireland, and the Channel Islands. By the Rev. W. A. Leighton, F.L.S. 12mo. Shrewsbury, 1871.

Within the last ten years no less than three Synopses, or systematic enumerations, of the British Lichens have been published in this country, viz. Mudd's 'Manual of British Lichens,' in 1861; the Rev. J. M. Crombie's 'Lichenes Britannici,' in 1870; and the work whose title heads the present remarks, in 1871. The significance of this circumstance must be interpreted by the correlative fact that, between 1844, when the second edition of the well-known 'English Botany' of Smith and Sowerby was issued, and 1861, no work of a similar kind had appeared; for Leighton's 'British Species of Angiocarpous Lichens' (1851), and other monographs of his, referred only to certain groups; while Lindsay's 'Popular History' (1856) did not profess to be a complete or systematic Lichen-flora, being intended simply as an Introduction to the study of the British Lichens. The three works first above mentioned, especially as compared with those which appeared prior to 1850, mark an era in British lichenology, in so far as they are all the fruits of the application of the *microscope* to the definition and classification of genera and species. This instrument was virtually unknown to, or unapplied by, the authors of the various Lichen-floras of Britain—of England, Scotland, or Ireland —before the year 1850; the only artificial aid to the naked eye in the examination of external or internal characters being, up to that date, the common pocket lens. The result of the introduction of the *microscope* in the examination and determination of Lichen-species has not been altogether an advantage. It has destroyed the comparative simplicity of classification and nomenclature, and has substituted, for the intelligible arrangements of Acharius, Fries, and Schærer, the confusingly elaborate "systems" of Massalongo, Körber, and Nylander. *Too much* is now made of microscopical or internal, too little of general or external, characters. In particular, *too much* consideration is given in classification to the character of the *sporidia* [which, by the way, in Leighton's 'Lichen-flora' are called *spores*,—a term of doubtful propriety, considering the close alliance between *Fungi* and Lichens, and the desirability of a *uniform nomenclature* of the same classes of organs or bodies in these two great cryptogamic families]; too little allowance is made for the wonderful *variations* of the sporidia in many, if not most, Lichen-species.

Chemical characters are, however, the last fashion of the day among lichenographers. After having differentiated species and genera to a mischievously elaborate extent, according to the varying characters of the sporidia, they are being further subdivided according as the thallus, apothecia, or hymenial gelatine give this or that reaction with hydrate of potash, hypochlorite of lime, or solution of iodine. In no work that has come under our notice is so much attention devoted, we believe *unnecessarily* so, to these so-called "chemical characters" as in Leighton's 'Lichen-flora.' Thus he subdivides the genus *Cladonia* according to the very variable chemical reactions of its species. By such characters he separates *sylvatica* from *rangiferina*, and *pungens* from *furcata*. For a similar reason he divorces *cana* from *jubata* in the genus *Alectoria!* The specific diagnosis of *Pertusaria faginea*, L., is based on chemical reactions alone, for we are told "spores not seen" (p. 242). Some of the marked irregularities of chemical reaction in Lichens, as applied to the diagnosis or definition of species, he himself not only admits, but is compelled to point out. Thus, under the head of *Umbilicaria erosa*, Web. (p. 158), he remarks, "In all our *British* specimens the reaction is medulla K—C red; but in Fellm. 92, and specimens from Dr. Nylander and Dr. T. M. Fries, the reaction is medulla K yellow C—." A similar irregularity is noted under *Parmelia conspersa*, Ehrh. (p. 135): "Weddell, in Lich. Prom. Publ., says that in *P. conspersa* the medulla, when moistened with K, becomes yellow, but almost immediately afterwards becomes red. This I am able to confirm fully, so far as regards *foreign* specimens; but on *British* specimens the yellow reaction takes place, but not always the red." These are mere illustrations of what *constantly happens* throughout the whole family of Lichens! In truth, the *reaction-test*, introduced by Nylander and adopted by Leighton, is so little to be trusted, that its results vary, not only in the hands of different experimenters manipulating the same species, but in those of the same observer, operating on the same specimen at different dates! Still more, then, is variation in result to be looked for in different specimens of the same genus, gathered under different circumstances of soil and climate. At present there seems no limit to the differentiation of Lichen-genera and species, and the necessarily involved multiplication of *names*, by the adoption of new "characters" that are trivial because they are *inconstant*. Classification is based on no single, uniform, or intelligible principle. Differentiation is determined sometimes by one character, sometimes by another,—the determining characters differing extremely in value, if sometimes they possess any value at all! Small genera are divided, while large ones are left intact, though the characters of the species of the latter are infinitely more varied than those of the former. In short, the whole system of arrangement is eminently arbitrary and artificial, complex and confusing. In Leighton's Lichen-flora, for instance, while there is only one species of *Usnea*, there are four of *Ramalina; Cladonia* and *Sticta* are each split up into three genera; while the intricate genus *Lecidea* is left with the enormous number of 233 species!

Our recent British Lichen-floras are all based on the classification and nomenclature of *Continental* lichenographers; and not a few of the additions that have been made of late years to the number of *British* Lichens owe their names and descriptions to Dr. Nylander, of Paris, having been originally recorded in the Regensburg weekly botanical gazette called the 'Flora.' The British works in question necessarily, therefore, partake of the vices of the Continental systems on which they are based. Thus, Leighton's 'Lichen-flora'—as do also Mudd's Manual and Crombie's Enumeration—illustrates the tendency of the modern school of lichenography towards extreme differentiation; excessive and unnecessary elaboration; mischievous multiplication of species and genera, and necessarily of names; incessant changes of name, especially of species and varieties; the nomenclature of inconstant and trivial varieties, instead of describing the general range and direction of variation; the substitution of mere "specific diagnoses" (so-called) for full descriptions; the supercession of primary external by secondary internal characters; the adoption of inconstant, and therefore trivial, characters as a means of distinctive diagnosis; the production and multiplication of mere collectors and labellers, instead of biologists. Hence, with all their excellences, we doubt whether such works as Leighton's 'Lichen-flora' are calculated to attract and multiply students of lichenology. It seems to us hopeless to expect to increase the ranks of British lichenologists until we attain a greater measure of simplification and intelligibility in our classification and nomenclature of the British Lichens. Nor is such simplification to be expected till we revert, in some measure, to the arrangements that existed in the *pre*-microscope era of lichenology; readopt the simpler classification and nomenclature of Acharius, Fries, and Schærer; arrange and name according to naked-eye, external, general characters, so far as is possible, while not omitting *any* important natural character from the full descriptions of the species; reduce the number of species to one-fourth or one-fifth by the adoption of type- or aggregate-species; abolish the separate nomenclature and rank of inconstant forms or varieties; and work upon some uniform rule as to names. Moreover, it must ever be borne in mind that lichenology does not consist in the mere *collecting and ticketing of a series of specimens!* Our lichenologists are too much simply *gatherers and labellers!* That herbarium is usually considered the most valuable, which contains the largest number of species and varieties, and especially of *new or rare* ones; whereas that is really, in our opinion, the most interesting and useful collection that contains the greatest number of *variation-forms* of common, and especially of economical, species. He is not the most usefully accomplished naturalist who has gathered the greatest number of species or varieties, that prove, in the hands of Continental systematists or nomenclators, to be *new or rare;* but he who knows most about *all* the characters—chemical, microscopical, economical, morphological—of our more familiar species, such as, among Lichens, the ubiquitous "Reindeer Moss," *Cladonia rangiferina.* Regarding *that* single species alone, a volume might be compiled equal in size to Leighton's 'Lichen-flora;' and we believe that the student who should make himself master of the contents of such a monograph—of the whole "natural history" of this cosmopolitan and useful *Cladonia*,—its structure, reproduction, chemical constituents, utility to man and the lower animals, the *rôle* it plays in the grand economy of nature in northern countries, its distribution and variation-forms under diversities of soil and climate, altitude and latitude,—would acquire a more valuable knowledge of Lichens than if he merely possessed an herbarium containing authentically-named specimens of *all* the species described in Leighton's 'Lichen-flora,' or even if he had himself collected them, and got them ticketed by Leighton or Nylander.

The latest-published work on British Lichens, that of Leighton, is not, as it might and perhaps should have been, in all respects the best. Thus, it is inferior to the 'English Botany' in so far as (1) the former contains no plates; (2) the latter gives general descriptions as well as specific diagnoses; while (3) the older work has the advantage, also, of greater simplicity of arrangement, there being only 41 genera and 439 species instead of 73 and 781. So long as there is no work giving, in addition to full descriptions of species, *plates* illustrative of the external characters as well as internal structure of all British Lichens, the 'English Botany' must continue *a* standard—if not, in a sense, *the* standard—work on British Lichens, to which all other British Lichen-floras should bear more direct and distinct reference than at present they do. It seems to us extremely desirable, for instance, that all British Lichen-floras should, until the 'English Botany' is superseded by a modern work of the same type,—a fully-illustrated 'Lichenographia Britannica,'—give the *modern synonyms* of all its genera and species. Certain genera have been abolished by the use of the microscope, which has shown us that they consist merely of sterile conditions of species of other genera, or that they really belong to the category of *Algæ* or *Fungi*. Such are the pseudo-genera *Lepraria*, *Spiloma*, *Variolaria*, and *Isidium*. But these obsolete genera are so common, that it is much more important for the student to know what they really are—to what species to refer them—than to become acquainted with the mere names of hosts of *new or rare* species, which are, in every sense, comparatively unimportant! And yet there is no special exposition of these old and once-important genera in Leighton's 'Lichen-flora,' though doubtless some of them are named, or otherwise referred to, under such heads as *Pertusaria*. A satisfactory description of the obsolete genera and species of the 'English Botany' would form a most useful and attractive essay on certain highly interesting features of the natural history of British Lichens, —including, as it would, an account of (1) the secondary reproductive organs; (2) various forms of hypertrophy, or degeneration, or arrested development, of the vegetative system; (3) various forms and causes of sterility; (4) the border-land between Lichens on the one hand, and *Algæ* and *Fungi* on the other. And *this* kind of information, again, would be infinitely more important to the student, who is more than a collector and labeller, than any list, with specific diagnoses, of species, and especially of *new and rare* ones!

Leighton's 'Lichen-flora' is inferior to Crombie's 'Enumeratio' in that the latter possesses an *index* of species, though *it* is neither quite correct nor quite complete; while Mudd's 'Manual' is superior in that it gives five *plates* of coloured drawings of sporidia, an *index* of species and varieties, an *introduction* descriptive of the general structure and morphology of Lichens, *measurements* of the sporidia, frequent descriptions of the *spermogones* based upon personal observation, critical and general remarks on the species, in addition to the mere specific diagnoses, and due notices of the minute (microscopic) *parasites*—Fungi, Lichens, or Fungo-Lichens—that so frequently infest the thallus or apothecia of certain Lichen-species. It is, moreover, better "got up," printed on better paper, in more legible type. No doubt all the additions that are desirable to Leighton's 'Lichen-flora'—including, for instance, an *index*, *glossary*, *bibliography*, and *introduction*—would seriously increase the size of a volume which, at present is a convenient one, as respects both size and shape. But, on the other hand, the present volume is, *pro tanto*, incomplete and defective; while it is desirable that a national work on such a subject *should* be as complete *in all respects* as possible. To the physiologist or biologist—to the scientific or philosophic botanist—the paucity of information regarding the *spermogones*, and the utter absence of all reference to *pycnides*, are serious defects; serious even in their bearing upon a *classification*, which might have been materially altered by full descriptions of the secondary reproductive organs of those species in which they have been discovered. The few references that have been made to spermogones, or their contents, by Mr. Leighton appear to have been taken at second-hand from Continental authors, probably Nylander. The following are illustrations of the few bald, unsatisfactory descriptions or references given. In the *Cetrariei*, we are told (p. 96), "*Spermogonia* marginal, in setuliform apiculi or black papillæ." In *Platysma* (p. 98), "Spermogonia minutely papillate or tuberculate." In the *Psoromiei* (p. 163), "Spermogonia with arthro-sterigmata:" in the *Imbricariei* (p. 121), "Spermogonia innate." In *Ricasolia* (p. 120), "Spermogonia in mastoid prominences." In *Umbilicaria* and the *Placodei* (pp. 154 and 174), "*Sterigmata* articulate." In *Psoroma*, and the *Pannariei* and *Physciei* (pp. 163, 164, and 141), "Sterigmata pluri-articulate." In *Parmelia* (p. 122), "Sterigmata 2–5-articulated:" in the *Parmeliei* (p. 114), "Sterigmata pluri-articulate, or with arthro-sterigmata." In only certain genera and their subdivisions are the characters of the *spermatia* given. In *Platysma* (pp. 98–102), the genus is subdivided into sections according to the character of the spermatia,—the only instance, however, in which they are here utilized in classification. In the *Eu-Lecanorei* (p. 180) we are told, "Spermatia various in form in different species;" but the variations in form in the different species are not given, so that such a statement is almost tantamount to no information at all!

In such a Lichen-flora as Leighton's there ought be a separate section, treating of the vegetable *Micro-parasites* that so commonly infest the thallus and apothecia of Lichens; so frequently produce deformities of their fructification; so often puzzle the student. Or, at least, under the proper species, mention should be made of their particular parasites. But Leighton's work contains no enumeration of, or reference to, the *Micro-fungi*, or *Fungo-lichens*, that are parasitic on Lichen thalli or apothecia; and though the British parasitic species of *Micro-lichens* are given (*e.g.*) under such generic heads as *Lecidea*, *Verrucaria*, and *Arthonia*, if we turn to such parasite-infested species as *Sticta pulmonacea*, *Peltigera canina*, *Parmelia saxatilis*, *P. caperata*, *P. physodes*, *P. olivacea*, *P. conspersa*, *Lecanora ventosa*, *L. vitellina*, *L. cinerea*, *L. subfusca*, *L. polytropa*, *L. glaucoma*, *L. ferruginea*, *L. Parella*, *Pertusaria communis*, *Lecidea fusco-atra*, *L. contigua*, *L. confluens*, *L. canescens*, *L. albo-atra*, or *L. excentrica*, we find no allusion to their *parasites*.

The following statistics, compiled from the works quoted, will serve to show both the general numerical richness of the British Lichen-flora at different dates, according to different authors; and the rate of progress in the addition of so-called *new species*, during the last thirty years.

1. 'English Botany,' 2nd ed. 1844.
   Number of genera, 41.
   Number of species, 439.
   Average number of species in each genus 10·70.
2. Mudd, 'Manual,' 1861.
   Number of genera, 105.
   Number of species, 497.
   Average number of species in each genus, 4·73.
3. Crombie, 'Lichenes Britannici,' 1870.
   Number of genera, 72.
   Number of species, 658.
   Average number of species in each genus, 9·14.
4. Leighton, 'Lichen-flora,' 1871.
   Number of genera, 73.
   Number of species, 781.
   Average number of species in each genus, 10·69.

If progress in knowledge is to be measured by the number of species added within a given period to a national Lichen-flora, it must be admitted that the progress of British Lichenology has been very great since 1844, inasmuch as the number of British Lichens has been, during these twenty-seven years, nearly doubled—the actual numbers being 781 against 439. Such a criterion of progress is, however, utterly fallacious. The first effect of such large additions, in the form of new species, is simply to bewilder the student, and render the existing confusion of classification "worse confounded." It seems to us infinitely more important to arrange in a simple, intelligible way, that will attract students, existing materials, than incessantly and inordinately to hunt after "new and rare" species, as is the fashion of the majority of our Lichenologists. But in saying so, we do not deny that collectors and collections have a recognized value, and that they are indispensable to the progress of Lichenological science. In the hands of the philosophic botanist new species will be relegated to their proper rank in classification, and they will be made to illustrate variations of form, peculiarities of local or general distribution, affinities of geographical floras, as well as many phenomena of the highest interest in the physiology, organology, and classification of Lichens. But, notwithstanding that, during the last thirty years, we have learned much concerning the minute anatomy of Lichens, and especially their reproductive organs; as well as concerning their chemical constituents and their economical applications, such a work as Leighton's 'Lichen-flora' really gives, *comparatively*, less information concerning the general natural history of British Lichens than did the good old 'English Botany,' which is so apt now-a-days to be set aside by the microscope-proud nomenclator.

The character of many, at least, of the "new species" recorded in Leighton's 'Lichen-flora' may be gathered from the following illustrations. Of *Verrucaria polysticta*, Borr. (p. 422), we are told "This and *fuscella* may be only states of the same Lichen." Then why separate them until they are proved, by sufficient characters, to be distinct, and each to require specific appellation? Of variety *æthiobola*, Whlnb., of *Verrucaria margacea*, Whlnb. (p. 416), "It is often difficult to separate this variety from the type." Then why make an arbitrary division? *Lecidea subnigrata*, Nyl. (p. 316), "vix separanda a *L. denigrata*," says Nylander himself, who nevertheless creates the separate species. *Lecidea circumpallens*, Nyl. is "vix nisi varietas *L. baccilliferæ*" (p. 336). *L. spododes*, Nyl. (p. 261), is "closely allied to *L. denigrata*, Fr., and probably a subspecies, though externally distinct." *L. homalotropa*, Nyl. (p. 337) is "near to *L. urceolata*, Ach. Doubtful if not both referable to *Melaspilea*." Var. *flavens*, Nyl. of *L. parasema*, Ach. (p. 270), "Latet sub *elæochroma*, Ach. (ex hb. Ach.) a quâ etiam parum diversa." Then why cumber an already complex Lichen-flora with unnecessary names and species? What necessity is there for, or what advantage in, naming and giving separate rank to such *forms*, conditions, or states, of species as var. *terrestris*, Nyl. of *Lecanora varia*, or form *cinerascens*, Nyl., of *L. badia?* This is a kind and degree of elaboration that is simply mischievous. It would seem, moreover, that, in not a few cases, species are based on a single imperfect specimen. This is the case apparently, for instance, with *Pertusaria sublactea*, Leight. (p. 245), of which it is noted that the spores are "unknown:" nor were they "seen" in the case of *P. faginea*, L. (p. 242).

In describing the "extensive portions of our country still unexplored as to Lichens," Mr. Leighton is in error in including "The whole of the north and north-western counties of Scotland, including the Hebrides, Orkney, and Shetland Isles." For so long ago as 1841, the Hebrides were botanically "explored" by Professors Balfour, of Edinburgh, and Babington, of Cambridge, whose "Catalogue of the plants gathered in the islands of North Uist, Harris and Lewis,"—including Lichens,—appeared in the 'Transactions of the Botanical Society of Edinburgh,' in 1844; while, so lately as 1866 and 1869, the Lichen-flora of Caithness, Sutherland and Inverness-shires, of Orkney, Shetland, and the Hebrides was the subject of special investigation by Dr. Lindsay. Large collections were made, and a list of some of the commoner species has already been published. Indeed in Mr. Leighton's own work he gives a number of localities in 'Lewis' (the Hebrides), 'Orkney'; 'Hebrides'; 'Coygach, Sutherlandshire'; 'northern parts of Scotland'; 'Long Island' (= the Lews or Lewis, Hebrides); 'Inchnadanf, Sutherland'; 'Glen Ach-na-Shilloch, Ross-shire'; 'Loch Carron' (Ross-shire); 'Orkney Islands'; 'Brough Head in island of Stronsa, Orkneys'; and 'Lerwick, in Shetland.' There can be no doubt, however, that for those Lichenists, whose ambition is to *collect specimens*, in the hope of Nylander, or other Continental nomenclator, discovering novelties or rarities among their gatherings, there is still ample scope in the British islands, even in the districts that have been the most frequently and thoroughly "explored." But collectors are so much more numerous than biologists that we would counsel the student, instead of hunting for "new species," to devote his attention to those that have been already discovered, making himself master, not only of their names and their specific diagnoses, but of *all their characters*, including their various *uses*. Such has been the activity of collectors and name-givers of late years, even since the issue of Crombie's 'Enumeratio' last year, that we can well afford to pause in our efforts to *add to the number* of the British Lichens, and cultivate a more thorough acquaintance with the present, only too numerous, members of our Lichen-flora.

In the foregoing criticism we have had occasion to indicate sundry *defects* of a work, which we hope will supply or correct them in a second edition. Turning now to the more agreeable subject of its *merits*, there can be no doubt that Leighton's 'Lichen-flora' contains an immense mass of valuable information regarding the British Lichens, arranged in convenient form, and occupying little bulk. This latest fruit of the prolific pen, and patient, laborious research, of our most venerable and venerated British Lichenologist is simply *indispensable* to all students of the British Lichens; and such students are to be found, not only in "Great Britain, Ireland, and the Channel Islands," but in all English-speaking and English-reading countries throughout the civilized world, including the principal nations of the continent of Europe.

W. LAUDER LINDSAY.

Hardy Flowers; Descriptions of upwards of 1300 *of the most Ornamental Species, and Directions for their Arrangement, Culture, etc.* By W. ROBINSON, F.L.S. London: Warne and Co. Pp. 341. 8vo.

A Catalogue of Hardy Perennials, Bulbs, Alpine Plants, Annuals, Biennials, etc., including a Complete List of British Flowering Plants and Ferns. By the same Author. London: Murray. Pp. 64. 8vo.

We have often been asked by the owners of gardens, interested in botany, where they could find a handbook in which was gathered together an account of the common hardy cultivated plants of the country. A little time ago it was not possible to answer the question satisfactorily, but now those who want such a book will find in the present work and in a similar one, published a year ago by Mr. Sutherland, who was formerly head of the herbaceous department at Kew, all that they can reasonably require. Both the authors are men of large experience and a thorough knowledge of their subject practically, and the books are published at such a moderate price that they are likely to command a large circulation. We trust that the publication of the two works may be taken as a sign that gardening taste is beginning again to flow in wider channels than those in which it has run during the last dozen or twenty years, for most lovers of British botany will agree with Mr. Robinson, when he says, "It is to me a cause of surprise that while we find persons going to great expense to build a glass box wherein to preserve a little of the pretty vegetation of New Holland, and other warm climates, which is of necessity always less beautiful and less satisfactory than vegetation flourishing in the free air, we may seek in vain in their gardens for a group of the noble hardy Lilies, for the vividly coloured and beautiful early spring flowers of northern and temperate climes, or for any interesting and beautiful hardy vegetation. We live in a country which is, on the whole, better calculated for the successful culture of the most beautiful vegetation of northern and temperate climes than any on the face of the earth, and, at present, we take as much advantage of it as if we lived in one where from extremes of some sort, such vegetation could not exist, and where extraordinary and expensive artificial means were requisite for the enjoyment of a little vegetable beauty. That the natives of cool latitudes are of an inferior degree of beauty cannot be admitted. Travellers who love many aspects of vegetation give the palm to that of the meadows, heaths, and uplands of cool countries, and the high mountain sides, near the line of perpetual snow; and, certain it is, that the finest Orchids of our stores do not surpass in beauty Lilies and Irises, that are as easily grown as common Seakale" (pp. 2–3).

The bulk of the present work is taken up with a catalogue, arranged in alphabetical order, of thirteen hundred species of perennial duration, selected from the great mass of hardy plants on account of their superior beauty, with a description of the general habit of each, the colour of its flowers, the time of the year at which it appears, the kind of soil and situation for which each is best fitted, and the mode in which it can be most readily propagated. Of course, such a list of favourite plants made by one man will never contain everything that another would wish to see in it, but the selection of genera and species has been made with great care and judgment. The rest of the book is taken up with chapters of general directions as to cultivation, with advice on the subject of arranging plants to the best advantage for display, and with copious lists of species of different habit, colour of flower, time of blooming, etc. The following is the plan of a bed of Lilies selected from a number that are given in the chapter on the grouping of hardy perennials:—

"This shall be a grand bed of Lilies. Unhappily the fine hardy kinds of Lilies are anything but as plentiful as they should be, though in a free rich soil they increase readily enough. Few may have them sufficiently plentiful for some time to make beds of them, but when once people know how truly fine they are when seen well arranged in a large bed in an isolated place, they will hardly rest content without such glorious garden ornaments. With such kinds as *Lilium testaceum* and *tigrinum*, var. *Fortunei* in the centre, surrounded by the queenly *candidum*, burnished *croceum*, spotted *canadense*, *pomponium*, *colchicum*, vivid *chalcedonicum*, and gradually worked down to the edge with dwarf but beautiful kinds, like *eximium*, *longiflorum*, and *tenuifolium*, a large circular oval bed might be made in the grass in some isolated spot which for the highest beauties of colour, form, and fragrance, for in fact almost every quality by which vegetable beauty endears itself to us, could not be surpassed by any arrangement of indoor or outdoor plants. The only precaution that need be mentioned is, that to grow Lilies well they should have three feet, or nearly that, of free loamy earth with a good dash of vegetable mould in it" (pp. 12–13).

Of the catalogue we need say little beyond what is contained in the title, and letting our readers know that there is such a list in existence, if they require it. It is intended, like the 'London Catalogue,' especially for marking desiderata, and for enabling collectors to check off, in a handy printed list, the species they possess. No authorities are given with the names, and a large number of mere garden-names are included; but the duration of each species is indicated, and those that are wild in Britain are printed in a different type to the rest.—J. G. B.

Botanical News.

The publication of Jordan's 'Icones,' which was interrupted by the war, in one of the engagements of which his young coadjutor Fourreau was killed, has now been resumed. Parts 53 to 56 have now been received in England, devoted to "splits" of *Salvia verbenaca* (of which ten are defined under the generic name *Gallitrichum*, one of which, called *G. anglicum*, comes from Wembury in Devonshire), *Androsace carnea*, *Allium Chamæmoly* and *Muscari racemosum* and *botryoides*. As usual, the plates are very carefully drawn and naturally coloured.

Dr. Eichler is pushing forward the publication of 'Flora Brasiliensis' with great energy. The parts just issued comprise the monographs of Klatt on the *Iridaceæ;* A. W. Bennett on *Hydroleaceæ*, *Hydrophyllaceæ* and *Pedalineæ;* Engler on *Saxifragaceæ;* Baker on *Connaraceæ* and *Ampelideæ;* the first portion of Doell on *Gramineæ*, and several sheets of index to parts published previously.

The part for 1870 of the Copenhagen 'Botanisk Tidsskrift' contains a paper by Professor Lange on the characters derived from the shape of the seeds and the sculpturing of the testa, of which we should like to give our readers an abstract, if any of our contributors could read Danish. It treats specially of *Pyrolaceæ*, *Droseraceæ*, *Cerastium* and *Pedicularis*, and there are plates of the seeds of twenty-five species of the last genus.

A lecture was given at Richmond on the last Friday in September by Mr. M. Moggridge on the scenery, geology, and botany of the neighbourhood of Mentone, the natural history of which he and his son have done so much lately to explore and illustrate. The greatest height that can be reached by walking parties from the town, returning the same day, is the peak of Graumendo, 4523 feet in elevation, commanding splendid views, and yielding to the botanist many truly alpine plants; whilst late in the spring it is dotted over with the crimson blossoms of the wild Peony (*Pæonia peregrina*). At the sea level the olive becomes a forest tree; and the lemon, far more delicate, yields four crops in the year. He has lately discovered in the neighbourhood worked flints, imbedded in solid breccia, at a depth of thirty feet, in company with the bones of the bear, hyena, and rhinoceros.

At the exhibition of the Royal Horticultural Society at South Kensington, in the first week of October, an interesting feature was the collection of fungi, edible contrasted with poisonous and unwholesome species, shown in competition this year, as in previous ones, for a prize offered by Mr. Wilson Saunders. The main exhibitors were Mr. Worthington Smith, Mr. English of Epping, and Messrs. Hoyle and Austen of Reading; the latter of whom took in conjunction the principal prizes. An address on the subject of the suitability of fungi for food was delivered by the Rev. M. J. Berkeley, and attentively listened to by a large gathering of ladies and gentlemen. It was generally admitted that this year's exhibition was a decided advance on any of its predecessors.

There is an abstract in the 'Gardener's Chronicle' for September 30 of an interesting series of observations by Professor Goeppert, of Breslau, on the protective influence as regards the temperature of the soil exercised by a thick layer of snow. In February of the present year he took the temperature three times daily in the air and twice below the snow, and found that whilst the daily means oscillated between 2·8° Cent. on the 16th instant, and 17·6° on the sixth, the average below the surface was 1·5° on the former day and 5° on the latter. He ascribes the loss of many alpine species in lowland gardens to the want of a protective layer of snow during the winter season. Those interested in the subject ought to read the paper in detail.

Apropos of the dehiscence of the anthers of *Parnassia*, on which Mr. A. W. Bennett has a paper in 'Linnean Journal,' vol. ix., Professor Asa

Gray states that he re-examined *P. caroliniana* carefully in a living state, and finds the anthers are quite as much introrse as extrorse as to insertion, and truly introrse for dehiscence. A transverse section removes all doubt, showing the connective to be posterior, and the anther, consequently, to be as truly introrse as possible.

Mr. MacOwan, of Gill College, Somerset East, Cape of Good Hope, who has been working very energetically lately in the exploration of the eastern tracts of the colony, and has established amongst the few Cape botanists an Exchange Club, on the model of our English one, writes to say that he wishes to be introduced to some British and European botanists desirous of having eastern Cape plants. For Britain he possesses only the wreck of a collection almost destroyed in transit to the colony, and for western and central Europe nothing at all. We hope that some of our readers will be able to help him, and can speak from personal knowledge of the excellence of the specimens he sends out.

The meetings of the Linnean Society will be resumed to-morrow, November 2, for the winter, beginning at the regular hour, eight o'clock.

A report of the result so far of the labours of Mr. Chalmers, who went out from Kew in 1868 for the purpose of establishing a Cinchona plantation in St. Helena, and improving generally its arboriculture, has been drawn up by Mr. J. C. Melliss, the late surveyor of the Crown lands in the island, who is now in this country. A suitable plot of land for the Cinchona, five acres in extent, was secured on the southern and windward side of the great central bridge, at an elevation of 2600 feet above the sea. Several Cinchona plants, including some raised from seed a year or two previous to 1868, were placed out in different parts of the high lands, secluded spots, safe from the tracks of cattle, amongst the native vegetation, being selected for them; and in the following year (1860) the general planting of 5 acres commenced, sufficient young plants by that time having been raised by seed, given to the island by Dr. Hooker. At the present time the plantation presents, in a healthy thriving condition, 500 trees of *Cinchona succirubra* and 300 of *C. officinalis*, numbering in all 800 plants; the tallest of these is a plant of *C. officinalis*, raised by Mr. Melliss, and planted out on the high land on October 14, 1868. It now measures 7 feet 2 inches above the ground. The next tallest tree in the plantation is one of *C. succirubra*, planted out in May, 1869, and now measuring 6 feet above the ground. About 300 of those first put out average a height of 4 feet 6 inches, and the remainder vary from that down to 6 inches. The cultivation of the species *C. Calisaya* and *C. Pahudiana* has not been continued, because it was found that in St. Helena they do not grow so well as the other species. The nature of the ground forming the plantation is very steep and rugged, which prevents it from being planted very thickly. It is incapable of containing more plants; and the fact of the surrounding land being in the hands of private persons, who do not as yet see the advantage to be derived from the cultivation of this valuable plant, is the chief reason for the non-extension of the plantation. The actual cost of these 800 trees, exclusive of Mr. Chalmers' salary, and such outlay as could not be fairly charged against a limited number of plants, has been £244. 19*s*. 3*d*., or very little over 6*s*. a tree. He has also planted out a number of trees of *Araucaria excelsa, Juniperus bermudiana, Pinus Pinaster*, *Podocarpus elongatus, Eucalyptus diversifolia*, and *Acacia longifolia*, and is trying to introduce the cultivation of Tobacco and Guinea

Hemp (*Sanseviera guineensis*), the latter valuable for its fibre; and is training up a number of apprentices with a view of their ultimately becoming useful in the island, where the arts of horticulture and arboriculture have been for many years much neglected.

The twentieth meeting of the American Association for the Advancement of Science was held in Indianopolis, Indiana, from the 16th to the 21st of August, under the presidency of Professor Asa Gray. The number of members in attendance is stated to have been about 200, which is about the same as in three previous years. An interesting excursion was made to the coalfields of Indiana, which were visited by 400 excursionists. They travelled in eight coaches, and rested for the night at Terre Haute, a town of 20,000 inhabitants, where lectures were delivered by Mr. Waterhouse Hawkins on winged reptiles, and by Dr. Gray on the fertilization of flowers by insects. The botanical papers read in the Section were—"On the Organic Identity of the Albumen and Endopleura of Seeds," by T. C. Hilyard; "The Monocotyledon the Universal Type of Seeds," by T. C. Meehan; "On the Apparently One-ranked Phyllotaxis of *Baptisia perfoliata*," and "On the Phyllotaxis of *Cucurbitaceæ*," by H. W. Ravenel; and "On the *Abies Douglasii* and a New Species or peculiar variety of *A. balsamifera* from the Rocky Mountains," by G. C. Swallow.

A very elaborate handbook of botanical geography will shortly be published under the title of 'Vegetation der Erde nach klimatischer Ordnung,' by Professor Grisebach, of Göttingen, well known by his monograph of *Gentianaceæ*, afterwards adapted for De Candolle's 'Prodromus,' and by his 'Flora of the British West Indian Islands.' It will occupy two octavo volumes of six hundred pages each, and no doubt will be a most valuable accession to the literature of the subject.

The second volume of the 'Flora of Tropical Africa,' containing the Orders from *Leguminosæ* to *Ficoideæ*, has appeared. As in the previous volume, Prof. Oliver has secured the assistance of several botanists; but he has taken the great proportion of the work on his own shoulders. He is author of the following Natural Orders:—*Leguminosæ* (excepting the *Papilionaceæ*, which have been monographed by Mr. J. G. Baker), *Rosaceæ*, *Saxifrageæ*, *Droseraceæ*, *Hamamelideæ*, *Halorageæ*, *Rhizophoreæ*, *Onagrarieæ*, *Cactaceæ*, and *Ficoideæ*; *Crassulaceæ* are the work of Mr. James Britten; *Combretaceæ* and *Myrtaceæ*, of Prof. Lawson; *Melastomaceæ*, *Cucurbitaceæ*, and *Begoniaceæ*, of Dr. Hooker; *Lythraceæ*, of Mr. W. P. Hiern, *Samydaceæ*, *Loasaceæ*, *Turneraceæ*, and *Passifloreæ*, of Dr. Masters. The proportion of new species is very large; and a new genus of *Papilionaceæ* (*Platysepalum*, Welw. mss.), allied to *Millettia*, is described.

For the encouragement of the Saturday half-holiday in London in connection with the field excursions for natural history purposes which have sprung out of it, prizes to the amount of thirty guineas are offered by the Duchess of Sutherland, the Countess of Ducie, and the Marquis of Westminster, for the competition of members of botanical, microscopical, and geological clubs, working-men's clubs, and the unprofessional naturalists of London generally. The subjects selected by the prize-givers require from the competitors an acquaintance with the mosses, pond-microzoa, and fossils of the London district, obtained by Saturday afternoon excursions to be made during the next twelve months. The prizes are offered through the Early Closing Association.

Original Articles.

ON THE BOTANY OF THE LIZARD PENINSULA.

By J. G. Baker, F.L.S.

Cornwall is one of those counties of Britain the distribution of plants within which is most imperfectly registered. As an extreme term for the island both in climate and geographical position it possesses a special interest, and its geological character is in addition so peculiar, that it would be very interesting to have its flora worked out in full detail. It is likely that there is not much left to be done in discovering rarities within its area, but a botanist, like myself—coming there from the eastern or central parts of the island, and knowing its flora so far as published records reach, the species that grow within the county as a whole, with a notion of comparative abundance and dispersion of the special rarities—finds much to interest him in seeing how abundant some of the specially western species are, and how many plants which he takes for granted are likely to be common, are found to be rare, or even altogether absent, from wide tracts. It is as a contribution towards a Cornish flora of this kind that these notes are put on record. The Lizard peninsula is not only the most southern, but botanically the most characteristic and interesting part of the county. The following list was made during a visit paid in August of the present year by Mr. A. W. Bennett and myself under the guidance of Mr. T. R. A. Briggs, whose previous knowledge of the district, and intimate practical acquaintance with west-country species in a living state, enabled us to make the catalogue much more complete than it would otherwise have been. The line of north limit within which we restricted ourselves was the high road that passes from Falmouth to Helston through Penryn, This encloses an area of something like a hundred square miles, and includes, in addition to the Serpentine region that fills up all the southern part of the Lizard promontory, both a tract on the north of it, underlaid by sedimentary Devonian strata, and a slice out of the tract of low undulated granite hills that fills up portions of the central ridge of the county, and the whole of the extreme west between Penzance, St. Ives, and the Land's End. The Serpentine extends from the west shore of the Lizard promontory at Mullion, past the north side of Goonhilly Downs, to the opposite shore at Manaccan, filling up an area of forty square miles. The centre of this is a bare uncultivated heathery plateau, rising to not more than three or four hundred feet above sea-level, almost entirely destitute even of planted trees, but a bare unbroken waste, extending in one part nearly from shore to shore, with abundance of Furze, both vernal and autumnal, intermixed with four kinds of Heath, the three that grow everywhere, and *vagans* more abundant than any of them, no *ciliaris* here at all, although it is plentiful a little beyond our bounds about Truro, broad open grass-bordered roads edged with *Agrostis vulgaris*, *Festuca ovina*, *Aira caryophyllea*, and *Triodia*, with *Plantago maritima* and *Coronopus*, *Sagina nodosa* and *Anthemis nobilis* mixed abundantly amongst them, and peaty pools in which the streamlets that run down the shore take their rise, yielding plenty of *Scirpus fluitans*, *Juncus supinus*, *Helosciadium* *inundatum*, *Myriophyllum alterniflorum*, *Hydrocotyle*, and *Peplis;* but nowhere any scrap to be seen of *Drosera*, *Sphagnum*, or *Narthecium*, all of which are common enough upon Dartmoor. This curious Serpentine region is not drained by any streamlet, even of moderate size, but only a few little rills run from the central moor to flow into the hollows between the great sea-crags, which are very fine all round this portion of the coast, but often only to be seen from the sea, or at considerable risk and expenditure of time from below at low tide. On the southern and western side of the down, between the little villages of Lizard-town, Llandewednack, Cadgwith, and the three neighbouring hamlets that take their name from Saint Ruan, the country is to a large extent brought under cultivation to the very edge of the seabank, but even here there are no hedges, and the pastures and corn or forage fields are separated from one another only by walls or earthy banks, on the top of which it is the custom of the country to carry the footpaths. So that it is only about the lower part of some of the streamlets that we get in the Serpentine tract any fruticose or arboreal vegetation, except it be a row of planted Tamarisks, or a stray Apple-tree, or an Elder, or planted Poplar near a house; and even in the midst of summer the region looks very monotonous and dreary, with nothing to check any wind that blows from east or west or south from sweeping right across it, and nothing to shelter plant or belated traveller from rain or storm, except a wall or earth-bank three or four feet in height, and not even that for miles across the open down. In considering the flora of the district, these circumstances need to be prominently borne in mind, for not only does there result from this exposedness a great cutting-off of sylvan and septal species that might otherwise be expected, but many well-known plants put on peculiar forms, clearly in consequence of the peculiar circumstances under which they are placed. Of *Genista tinctoria*, *Arenaria verna*, and *Spartium scoparium*, varieties from the district have been named already, and we may instance also *Anthyllis Vulneraria* (*A. Dillenii*) and *Lotus corniculatus*, as occurring with fleshy leaves, and more or less reddish flowers, *Poterium Sanguisorba*, *Sanguisorba officinalis*, *Serratula tinctoria*, and *Centaurea nigra*, reduced down in extreme cases to monocephalous forms two or three inches in height, and *Daucus maritimus* and *Crithmum* dwarfed down to a single tuft of radical leaves, with a single umbel nearly or quite sessile in the centre. There is very little scope in the Serpentine tract for the maritime plants that affect sandy beaches. Of the walls and earthbanks that border the shore, the most abundant plants are *Armeria maritima*, *Cerastium tetrandrum*, *Spergularia rupestris*, *Silene maritima*, and *Beta maritima*, with a wonderful quantity of *Crithmum* and *Ramalina scopulorum* everywhere about the rocks, and on the sandy slopes *Aira caryophyllea*, *Thymus*, *Jasione*, *Plantago Coronopus*, *Herniaria*, *Scilla verna* and *S. autumnalis*, and *Sedum anglicum*. On the north of the Serpentine tract we pass on the north-east of Goonhilly Downs about Manacean, Helford, St. Martin, and St. Anthony, into a tract of Devonian country where there are lanes and hedgerows, in which shade-loving plants like *Hypericum Androsæmum*, *Calamintha officinalis*, *Aspidium angulare*, and *Nephrodium æmulum* show themselves, and where *Erica vagans*, *Herniaria glabra*, *Arenaria verna*, the *Scillas*, and many more special Serpentine species are left behind. The creek that runs into the interior, south of Falmouth, for many miles, and nearly joins at its head the hollows that run down in a western direction past Helston to Looe pool would, perhaps, have been a more natural northern boundary for our list than the one we have taken. North of the creek, the space between the eastern and western shore of the promontory is not less than ten miles, and there is in the centre a tract of undulated granite-country that stretches from Constantine and Helston beyond our bounds into the centre of the county, and on the east of this, stretching down to the shore of Falmouth, extends a tract of still more decidedly sylvan and sheltered Devonian country which furnishes a marked contrast with the Serpentine. Here are situated, on the sloping banks of a small stream, opening out towards the south-east to the mouth of Falmouth harbour, the garden and grounds of Pengerrick, the residence of R. W. Fox, Esq., F.R.S., in which are cultivated in the open air a large number of trees and shrubs of delicate constitution, that cannot be grown without winter-shelter round London. We saw here a Rhododendron, measuring 180 feet in circumference, and well-established trees or bushes, grown without shelter, of *Erica arborea*, *Laurus Camphora*, various species of *Eucalyptus*, *Metrosideros*, and *Melaleuca*, several of the long-leaved Mexican Pines and Sikkim Rhododendrons, *Chamærops humilis*, *Benthamia*, *Arbutus*, and *Pernettya* with ripe fruit, a tree of *Prunus Laurocerasus*, 40–50 feet high, with a trunk as thick as a man's body, flowering tufts of *Phormium tenax*, bushes of blue-flowered *Hydrangeas* growing by dozens like Willows by the stream-side, *Aponogeton distachyum* producing copious flowers and fruit, acclimatized *Pteris cretica*, and *Woodwardia radicans*, *Selaginella Kraussiana* making itself quite at home amongst the grass of the lawn mixed with indigenous *Hypnum* and *Plagiochila*, *Echeveria glauca* growing out permanently in beds with Canarian *Sempervivum* and Cape *Mesembryanthemums*, and many other interesting indications of what horticulture may accomplish in a climate where the thermometer seldom sinks below freezing-point, and bedding Geraniums (*Pelargonium zonale*) last sometimes through winter without drooping their leaves.

In the following catalogue we have noted only those species which we saw ourselves in an excursion of four days' duration, during which we directed our attention specially to the dispersion of the mass of species, in preference to spending our time in searching minutely for rarities already recorded. At the time of our visit, of course some of the early-flowering plants were no longer recognizable. For instance, we could not make out at Caerthilian the three rare Trefoils (*Bocconi*, *strictum*, and *Molinerii*) which grow there in company on an exposed sandy bank, and are in perfection in June. I have noted also in their regular sequence several plants which we expected, but failed to see, as many common species fall under this head, and there can be no doubt that the desiderata of this Lizard flora furnish one of its most remarkable characteristics. It is likely that the plants which we failed to see are at most comparative rarities, but I hope that those who follow us into the district will take our catalogue as a basis, and place their additions to it upon record, and that botanists of the Peninsula, residents and visitors, will bear in memory that an interesting question in English botanical-geography, about which as yet very little has been said, in addition to what Mr. Watson has summarized by gathering together the plants of a strikingly eastern plan of dispersion under his Germanic type of distribution, is how many plants common enough all through the centre of England run out more or less decidedly in the south-west.

Clematis Vitalba. Pengerrick woods.

Thalictrum flavum. Not seen.

Anemone nemorosa. Noted only in the granite tract west of Penryn.

Ranunculus aquatilis. Not seen.

R. hederaceus. Frequent in ditches and streamlets. *R. Lenormandi* and *R. tripartitus* looked for without success.

R. Flammula. Frequent, with var. *pseudo-reptans.*

R. Lingua. Sparingly among reeds at the mouth of the stream at Gunwallo.

R. acris. Common.

R. repens. Common.

R. bulbosus. Not seen.

R. hirsutus. Frequent by roadsides and about houses.

R. sceleratus and *arvensis.* Not seen.

Caltha palustris. Not seen.

Aquilegia vulgaris. Hedgebanks in the Devonian tract about Manaccan and Durgan, looking indigenous.

Papaver hybridum. Once seen in a cornfield near Mullion.

P. Rhœas. Everywhere common; var. *strigosum*, by side of a road at St. Ruan.

P. dubium. Never seen.

Chelidonium majus. Hedgebank in Helford village.

Glaucium luteum. Sandy shore of the Helford Creek at Durgan.

Fumaria pallidiflora. Once seen by the side of the road going out of Cadgwith to Poltesco.

F. confusa. Frequent in corn and turnip-fields.

F. officinalis. Common.

Coronopus didyma. Everywhere one of the commonest weeds about farmhouses and villages.

C. Ruellii. In similar places to the last but much less frequent.

Lepidium Smithii. Everywhere frequent, on the earthy banks, by the sides of the roads, and between the fields.

L. campestre. Not seen.

Cochlearia officinalis. In several places among the sea cliffs.

C. danica. By the shore at Gunwallo and Helford.

Draba verna. Wall tops.

Koniga maritima. Earth-bank at Lizard town near a garden.

Cardamine pratensis. Not common.

C. hirsuta. Roadsides, unfrequent.

C. sylvatica. Wallside at Falmouth.

Barbarea vulgaris. Unfrequent.

B. præcox. Roadsides near villages Helford, Ruan-Minor, etc.

Nasturtium officinale. Common in ponds and ditches. Var. *siifolium*, in the low part of the Caerthilian streamlet.

N. terrestre and *N. sylvestre.* Neither seen.

Sisymbrium officinale. Common.

Erysimum Alliaria. Not seen.

Cheiranthus Cheiri. Casual on walls at Penryn, etc.

Brassica Rapa. Frequent in cultivated fields.

B. oleracea. All through the western half of Cornwall they have a plan in the cornfields of gathering the refuse together in heaps three or four yards in diameter, and planting upon these a crop of Cabbages, and when the Cabbages are grown and taken away, spreading what remains over the land. At the time of our visit, late in August, the corn was reaped, and these Cabbage 'pies' stood conspicuously exposed. Of course the plan of proceeding abstracts a good piece of the field from its proper crop, and it is looked upon by the rising generation as old-fashioned and unprofitable.

Sinapis arvensis. Common.

S. alba. Once seen on a rubbish-heap at Llandewednack.

S. nigra. Everywhere common by roadsides and in cultivated fields.

Raphanus Raphanistrum. Frequent.

R. maritimus. In many places near the shore round the Serpentine from Kynance to Cadgwith.

Reseda luteola. Everywhere common on earthy banks, and as a weed in cultivated fields.

R. lutea. Not seen.

R. suffruticulosa. One plant on the shore of Falmouth Harbour, near the pier.

Helianthemum. The genus seems to be entirely absent from the county, and is not known about Plymouth.

Viola palustris and *V. odorata.* Neither seen.

V. hirta. On the Serpentine at Kynance Cove, and in the Devonian tract in hedges about Durgan.

V. sylvatica. Frequent. Var. *Reichenbachiana* seen in the granite tract west of Penryn.

V. canina. All over the Serpentine downs of Goonhilly and Pradannack, the ovate-leaved typical form passing into lanceolate-leaved *lactea.*

V. tricolor, var. *arvensis.* Frequent, but the large purple-flowered form never seen.

Drosera. None seen.

Polygala vulgaris. Frequent.

Elatine hexandra. Shore of Carminho Creek, near Helston, sparingly.

Silene inflata. Frequent.

S. maritima. Everywhere abundant on the seabanks.

S. anglica. A common cornfield weed.

Lychnis Flos-cuculi. Unfrequent.

L. diurna. Common. A form seen with laciniated petals.

L. vespertina. Not unfrequent, running into the last.

L. Githago. A rare weed.

Sagina apetala. Common.

S. ciliata. Frequent on the sandy seabanks about the Lizard.

S. procumbens. Common.

S. subulata. All round the coast on the Serpentine from Mullion to Polteseo.

S. nodosa. Frequent on the Serpentine Downs, especially Goonhilly.

Spergula arvensis. Common.

Honckeneja peploides. Sandy shore of Carminho creek.

Spergularia rupestris. Everywhere abundant on rocks and walls near the sea. Neither *neglecta* nor *marginata* anywhere seen.

S. rubra. Not unfrequent in sandy soil.

Arenaria serpyllifolia. Frequent, including var. *leptoclados.*

A. verna. Amongst rocks along the Serpentine, near the coast from Mullion southward to the Lizard.

A. trinervis. Rare.

Stellaria media. Common; var. *Boreana* seen near Mullion.

S. Holostea. Rare.

S. graminea. Frequent.

S. uliginosa. Rare.

Cerastium triviale. Common.

C. semidecandrum, *glomeratum*, and *arvense.* Not seen.

C. tetrandrum. Frequent in sandy places all round the coast.

Linum usitatissimum. A stray near Falmouth.

L. angustifolium. Everywhere frequent by roadsides and in pastures.

L. catharticum. Frequent.

Radiola Millegrana. Goonhilly and Pradannack downs, springing up where the turf has been pared away.

Malva moschata. Roadsides at Newtown, Gunwallo, etc.

M. sylvestris. Common.

M. rotundifolia. Waste ground at Grade and Lower Pradannack.

Hypericum Androsæmum. Lanes of the Devonian tract at Durgan and Manaccan.

H. perforatum. Frequent.

H. tetrapterum. Not unfrequent.

H. undulatum. Swampy thickets at Mawnan and Pengerrick.

H. humifusum. The commonest species of the genus in the district.

H. pulchrum. Frequent.

H. hirsutum. Nowhere seen.

Acer Pseudo-platanus. Hedgerows and planted woods.

Erodium maritimum. Walls and banks, common both near the sea and about the inland villages and farmhouses.

E. cicutarium. Sandy banks, less frequent than the last.

E. moschatum. In similar places to the last, and equally frequent. I feel no hesitation, after seeing this in scores of stations, in accepting it a genuine native of Devonshire and Cornwall.

Geranium pratense, *pusillum*, and *lucidum.* Nowhere seen.

G. molle. Common.

G. dissectum. Frequent.

G. columbinum. Hedgebanks in the Devonian tract about Durgan and Mawnan.

G. Robertianum. Common.

G. sanguineum. Amongst rocks about both the streams at Kynance.

Oxalis Acetosella. Rare, and not seen at all in the Serpentine tract.

Euonymus europæus. Hedge west of Penryn.

Rhamnus. Neither species seen.

(*To be continued.*)

ON SUNDANESE VERNACULAR NAMES.

By Dr. H. C. C. Scheffer,

Botanical Gardens, Buitenzorg.

Dr. Seemann published in the seventh volume of the 'Journal of Botany' (page 333) an article treating of vernacular names and their great consequence. Of how much importance they are I can observe daily. It has already been mentioned by different authors that the inhabitants of the western part of Java (the Sundanese) are known to be good botanists, and that they use in some degree the Linnæan nomenclature. They have ordinarily names for certain groups, and for the species of these groups they have also a special name. In the classification of these groups they often are mistaken, but this is especially the case with those plants that are only to be found in the woods of the higher regions; for, as there are no villages (kampoeng), the names of those plants are unknown to them. As an illustrating instance I give the name of *tjantigi* (pron. tyánteeguee), which they apply to nearly all the *Ericaceæ*, to *Myrsine* and *Leptospermum*, and perhaps to other plants with leaves similar to the above-mentioned.

Mr. Motley's remark, quoted by Mr. Collins in the same volume, page 361, is thus very true. For example, the name for nearly all the *Laurineæ* is *hoeroe* (pron. hooroo), at Sumatra and Bangka *mádáng;* for all the *Melastomaceæ*, *hárèndong;* for almost all the Ferns, *pákoe* (pron. pákoo); for all the epiphytous Orchids, *ánggrèk;* for several *Acanthaceæ* and *Labiatæ*, *djarong;* the name *kiara* (pron. kee-árá) is used for many species of the genus *Ficus; kilampani* (keelámpánee) for *Ardisia* and *Climacandra; kanèka* for the *Rhizophoreæ; pásá* for Oaks. Concerning Dr. de Vry's remarks, also quoted by Mr. James Collins, I must remark, (1) that *kiara* is only the name for *certain* groups of the genus *Ficus;* for the other groups other names are adopted: (2) that the *Quercus fusiformis*, Jungh. (*Q. Junghuhnii*, Miq.) does not bear the name of *kiara*. This tree, as is known, varies from the other *Quercus* by its peculiar habit and by its fruits. It is thus not surprising that the natives do not recognize this tree as a *Quercus* (*pasan*). Junghuhn misunderstood the name, which is really *tjara-anak* (*tjara* = resembling to; *anak* = children). In other parts of Sunda the name is *rijoeng-anak* (pron. reeyoong-ánák; *rijoeng* = around).

There are two causes for depreciating the value of vernacular names. The first cause is that not all the natives know all the indigenous plants. Most of them know the names of those common plants which are used for medical and culinary purposes, but only few know the plants which are found in the midst of the forest. Besides, the natives believe it unpolite not to answer a question, and, to please the interrogating traveller, they give a name of whose exactness they are not certain. The second cause is the small linguistic knowledge of most of the travellers. I have always applied myself to a careful inquiry about vernacular names, and though I am already a little accustomed to the foreign Sundanese sounds, I am often obliged to question my collectors several times before getting certainty about the names. One must be accustomed a long time to a language before being able to catch the sounds.

Usually the Malayan names are given more correctly than the Sundanese ones. The greater part of the Europeans in the Archipelago speak more or less the Malayan language, but those who speak also Sundanese are very few. In consequence a great confusion is to be found in the Sundanese names.

For their specific names they like to use some characteristic words: for example, *soesoe* (pron. soosoo), they use for a fruit which has the form of the breast of a young maiden; *curit* (pron. cureet), properly *mouse*, for a small sort; *minjak* (oil = smooth), for unarmed species of a genus that commonly possesses thorns (for example, *Erythrina*).

The signification of some names is often very obscure; in other names it is easy to be found, e. g., *katoe-toengkoel* (pron. kátootoongkool), the name of a species of *Polygala* of the subgenus *Chamæbuxus*. *Toengkoel* signifies *to lean over ; ka* is the prefix for the passive form ; *toe* a very common reduplication. The whole name is derived from the fact that the pericarp is leaning over the seeds; the seeds are thus considered passive, and the plant named after the seeds. I am persuaded that, by a careful study of the Sundanese language and of the names of plants, it will be easy to find other similar interpretations.

I cannot agree with Mr. Motley, when he says that the Sundanese do not possess a written language. They employ characters which are nearly similar to the Javanese ones. Their literature is not very extended, but they possess some manuscripts.

It would be very desirable that a general manner of spelling were adopted for all the vernacular names; for, as all the botanists have written them after their own pronunciation, a comparison is hitherto impossible. To prove this assertion, I might cite the Malayan names, collected by English and Dutch botanists. The importance of this remark is very obvious in comparing the vernacular names of Palms, given by Griffith.

AN ARRANGEMENT OF THE BRITISH WILLOWS.

By the Rev. J. E. Leefe, M.A., F.L.S.

Professor Babington was so obliging, a year or two ago, as to send me a sketch of an arrangement of the British Willows, based upon the method of Dumortier.* Dumortier's writings I have not seen; but Fries in his Novit. Fl. Suec. Mantiss. prima, p. 37, anno 1832, refers to two arrangements suggested by that botanist, of the former of which, taken from the nectary, he says that it is "omni attentione digna." I may remark that Koch, in his 'Commentatio de Salicibus Europæis," anno 1828, did not fail to notice that characters are to be derived from the nectary; and constantly refers to the proportion between the pedicel and the nectary in the different species, apparently knowing nothing of Dumortier's observations; and even Seringe, anno 1815, remarks that "Les glandes florales ou nectaires présentent aussi quelques caractères." Both Fries and Dumortier, it would seem, from Professor Babington's paper, adopt pretty much the same subgenera. I hope an old-fashioned observer of Willows may be pardoned for thinking that, in a natural genus like *Salix*, it is inadvisable to distract the student's attention by the introduction of new subgeneric names, if it can be avoided; and especially of names which do not carry an obvious useful meaning on the face of them, but are rather a burden upon the memory.

With a view to contribute something, so far as I am able, towards establishing clear and workable characters in this difficult genus, I would now beg to be permitted to make a few remarks on the sectional characters proposed by Mr. Babington in his interesting paper.

Section 1. *Vitisalix*, Dumort. Mr. Babington says, Catkins and their leafy stalk deciduous together. Nectary of two pieces; vernation convolute. The peduncle (the leafy stalk) of the catkins in the *Pentandræ*, *Fra-*

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[*] Published in this Journal, Vol. I. (1863), pp. 167–172.

giles, *Albæ*, and *Triandræ* is often permanent, the catkins being separately detached. Hence arise the short leafy branches, often seen in the summer, having buds in the axils, from which the catkins have fallen. Peduncles with buds in the axils may be expected not to be caducous. The *Pentandræ* may be distinguished from the *Fragiles* by the petioles, which are glandular above, and the glandular serratures in the lower part of the leaf, a character rarely seen in the *Fragiles* or *Triandræ*. The *Albæ* differ in the ciliated leaves of the peduncle. The young leaves in all are inflexed. The nectary in the *Pentandræ*, *Albæ*, *Fragiles*, and *Triandræ* is double in the male, but only single in the female, according to my observations. The nectary in the male of *S. alba-cærulea* is generally notched next the axis, and a single gland between the stamens and the scale. In *S. cuspidata*, male, E. Bot. Suppl., I find the nectary to be deeply notched next the axis, and sometimes there are two or three next the scale, the whole forming a sort of cup, out of which spring the stamens. Moreover, I see a remark in my notebook that in *S. fragilis*, *S. alba*, *S. cærulea*, and *S. cuspidata*, male, E. Bot. Suppl., the nectary next the scale is seated rather higher than that next the axis. *S. triandra*, *S. undulata*, *S. cuspidata*, *S. pentandra* are rather large shrubs than trees. Although the young leaves in *Vitisalix*, Dumort., Bab., are generally inflexed, yet in *S. hippophaefolia*, Thuil., usually placed among the *Triandræ*, the young leaves are partly reflexed,—indicating, it would seem, some affinity with the *Viminales* or with *S. rubra*, Huds.

Section 2. *Caprisalix*, Dumort. The characters which Professor Babington gives are in accordance with my own observations.

Subsection 1. *Helice*. The young leaves in the *Purpureæ*, Borr., are generally inflexed, except that in the male of *S. rubra*, Huds., they are somewhat reflexed, as in *S. hippophaefolia*, Thuil., above noticed. The nectary in the *Purpureæ* and *Viminales* is single, both in the male and female, and placed as Professor Babington describes.

Subsection 2. *Vimen*. I find the stamens free and the nectary somewhat elongated. The young leaves are quite rolled back or reflexed at the margin. The peduncle in *Caprisalix*, Dumort., is not persistent. In *Viminales* the stipules are generally narrow and often absent. In *S. stipularis*, Sm., the broad-pointed stipules almost, if they do not quite, equal the petiole. In *S. Smithiana*, E. Bot., the stipules are narrow lunate; the leaves ovate, elongato-lanceolate. In *S. Smithiana*, Willd., the leaves are more oblong; the stipules broader and the pubescence coarser and less silky beneath.

Subsection 3. *Vetrix*, Dumort. i. *Capreæ*. The nectary is single, the peduncle is, I think, not persistent, and the vernation is different, I believe, from that of the *Purpureæ*. In the *Purpureæ* the young leaves are inflexed at the margin; whereas, in *S. cinerea*, *S. aurita*, L., *S. acuminata*, Sm., they are distinctly reflexed, especially in the lower half; not so, I suspect, in *S. caprea*, L. The style of *S. acuminata*, Sm., is much longer than in the other *Cinereæ*. The style in them is *very* short, the pedicel *very* long. In the *Phylicifoliæ* and *Nigricantes*, on the other hand, the style and pedicel are both elongated. The stipules in the *Nigricantes* are usually larger, more acute and conspicuous than in the *bicolores*. In Mr. Babington's group "*virentes*," the leaves are far from being always smooth; but the pubescence, though often present on the under side, is different from that of the *Cinereæ*, and the young leaves are mostly inflexed in the margin, both in the *Phylicifoliæ* and *Nigricantes;* although in *S. Andersoniana*, Sm., I have seen the young leaves partially reflexed, as in the *Cinereæ*. In *Vetrix*, excepting perhaps the group *Daphnoideæ*, the peduncle is, I believe, not persistent. I am afraid that *S. laurina* cannot be satisfactorily distinguished from *S. phylicifolia*, L.

ii. *Incubaceæ*. *S. rosmarinifolia* and *S. angustifolia* approach the *Viminales*, but the young leaves are not reflexed in *S. rosmarinifolia*, nor in *S. Doniana*, nor in *S. ambigua*. They have a tendency to turn black in drying. I have never seen British specimens of either *S. rosmarinifolia* or *S. angustifolia*, Wulf. In *S. ambigua*, male, var. *spathulata*, the nectary is short and somewhat emarginate.

iii. *Daphnoideæ*. In *S. venulosa*, Forbes, the scale is pale, rounded, fringed; the nectary surpasses the base of the ovarium; the style is rather short, but longer than the thick, yellowish-green, notched stigmas; the scale has at times a brownish tinge towards the point. In *S. glauca*, Sm., the ovarium is short, ovate, sessile. The nectary surpasses the base of the ovarium and is rather broad and blunt. Stigmas subsessile and divided. The style is often short in the forms of *S. Arbuscula*. In *S. glauca*, Sm., the leaves are entire at the margin; the veins strongly prominent below, depressed above. In *S. Arbuscula* the colour of the under side of the leaf is generally a dull green, and the stipules are small or absent. The veins are often most conspicuous in the upper surface of the leaf, which presents a reticulated appearance to the eye. In *S. Arbuscula* the peduncle is, I think, persistent.

iv. *Chrysanthæ*. The description, leaves broad, roundish, does not apply to *S. acutifolia*, W., which in habit and in other respects bears so little resemblance to *S. lanata*, L., and *S. hastata*, L., that it ought surely to be placed in a different section, though I am aware that Fries has sanctioned this arrangement from regard to the fructification only. *S. acutifolia* and *S. pomeranica* appear to bear the same relation to the *Præcoces* or *Sessiles*, that *S. alba* and *S. fragilis* do to the *Pedunculatæ*. They are the arborescent species in their respective sections. In *S. lanata* the nectary is about equal to the pedicel; the scale is very broad, somewhat membranous in texture below, brown above; ovary smooth; style about equal to the thick upright stigmas; scale very villous; the young leaves are not reflexed, and the veins are prominent beneath. The leaves are ciliated at the margin, and are often overspread with a cobweb-like pubescence. In *S. malifolia* the peduncle is, I believe, persistent, and the under surface of the leaves is cinereous. *S. lanata* and *S. malifolia* are nearly related, though, as the former has sessile catkins and the latter pedunculate, they cannot well be placed together. In both the stipules are conspicuous. The nectary in *S. malifolia* is rather thick, short, and abrupt, and not equal to the smooth pedicel. The scales are very villous and brown above. The style is longer than the notched and cohering stigmas.

Section 3. *Chamælyx*, Fries. The nectary in *Chamælyx*, so far as I have seen, is single in the usual situation, next the axis, but it is sometimes, though not always, cloven to the base.

i. *Myrsinites*, L. Catkins at the end of the terminal shoot, or from a lateral shoot. Aments often in appearance like a young Larch cone. Filaments, anthers, ovaries, stigmas tinged with pale blue or violet. The stipules are conspicuous in the young downy shoots, and the under side of the leaves is of a metallic green, bright and shining. In the *Arbusculæ* the young shoots are smooth; the stipules generally wanting; under surface of the leaves a dull green. In *Myrsinites* the veins of the inflexed leaves are more prominent below than above; whereas in the *Arbusculæ* they are often more apparent above than below. The peduncle of *S. myrsinites* is leafless towards the base of the ament. The serratures in *S. myrsinites* are more conspicuous and glandular than in the *Arbusculæ*. *S. procumbens*, except in size, is very near *S. myrsinites*. The nectary is a single, short, thick, blunt, pinkish gland.

ii. *Reticulatæ*. Catkins on a leafless stalk, with a leaf opposite and a bud between. Leaves on rather long petioles without stipules. Nectary (?) cloven.

iii. *Herbaceæ*. Peduncles short, bifoliate, with roundish, crenato-serrate, exstipulate leaves, and axillary buds. Petiole very short. Nectary probably cloven.

S. Grahami, Borr., belongs here, and appears related to *S. retusa*, especially the form *S. Kitaibeliana*, W. The leaves are inflexed when young, almost sessile, with shallow rather remote serratures, shining above, paler beneath, and with prominent veins on the under side, without stipules. Principal veins nearly parallel, but when held up to the light the leaves are seen to be reticulated with veins between. Nectary single, but sometimes cloven. The Irish Willow, the discovery of which was recorded by Dr. Moore in the 'Journal of Botany,' is as nearly as may be identical with *S. Grahami*, Borr., and is a very interesting addition to our flora. I believe Dr. Moore correctly refers *S. polaris*, Forbes, S dict. Bot. t. 63, to *S. Grahami; S. polaris*, Wahl., is very different.

In the above remarks I have confined myself almost entirely to the characters of the sections which Professor Babington gives from the writings of Dumortier. This arrangement may eventually be adopted, but the characters appear, as regards the British species, first to need some correction.

Mr. Babington considers the British Willows to be a disgrace to our flora. The discrimination of them is really no easy matter, and allowance should be made for the inherent difficulty of the subject. To be understood, the Willows should be cultivated and observed at different seasons; and a practised eye is more to be relied upon than the characters found in books. This qualification no one ever possessed more perfectly than the lamented Mr. Borrer. To a thorough knowledge of the subject he added the utmost willingness to impart his knowledge to others, and to enrich their collections from his abundant store both of specimens and living plants. No botanist ever took a more natural and comprehensive view of the genus. No difference, however slight, escaped his notice or failed to have due weight attached to it. He was one who, as he himself expressed it, had no theory to support, but sought only to understand nature. A remark of the learned Fries will fitly conclude these observations, which I fear have run on to too great a length, "Characteres non specierum sunt criteria, sed ad species dignoscendas adminicula. Ex his modo species agnoscuntur, ex vegetationis indole cognoscuntur. . . . Hinc Linnæus in speciebus discernendis non characteres sed oculorum judiciique aciem laudat."

Conspectus Salicum Britannicarum.

i. *Pedunculatæ.*

(Amenta ramulis persistentibus insita.)

* Amenta lateralia coætanea; squamæ concolores; nectarium in planta mascula duplex, in fœminea unicum.

1. Squamæ amentorum ante maturitatem fructus deciduæ.

a. Petioli eglandulosi; amenta diandra. Arbores.

α. Folia supra nitida et virentia, plerumque glabra. (*Fragiles*, Borr.)

S. fragilis, L., etc.

β. Folia supra opaca, alba, pilosa; folia pedunculorum ciliata. (*Albæ*, Borr.)

S. alba, L., etc.

b. Petioli apicem versus glandulosi; stamina tria vel plura. Frutices. (*Pentandræ*, Borr.)

S. pentandra, L.
S. cuspidata, E. Bot. Suppl., etc.

2. Squamæ amentorum persistentes. Frutices viminei. (*Triandræ*, Borr.)

a. Amenta triandra; rami annotini, apicem versus plus minusve angulares, vel etiam sulcati, glabri; folia sæpe elongata, serrata, glaberrima.

S. amygdalina, L., etc.

** Stipulæ prægrandes, petiolum æquantes vel superantes; nectarium unicum; squamæ amentorum villosissimæ; villus elongatus, candidus; ovaria glabra; folia infra cinerascentia. (*Hastatæ*, Borr.)

S. malifolia, Sm.

*** Folia pæne integra, infra albo-tomentosa; nectarium unicum, basin ovarii superans. Ovarium subsessile, tomentosum; stigmata bifida; stylus postea elongatus; squamæ apicem versus fuscæ. (*Glaucæ*, Borr.)

S. glauca, Smith, etc.

**** Frutices nani, ramosissimi.

1. Squamæ amentorum vix concolores, persistentes; venæ foliorum, supra depressæ, speciem reticulatam præbent, infra inconspicuæ; folia glabra vel glabrescentia, exstipulata, serrata, infra pallida; nectarium unicum, ovarii basin exsuperans. (*Vacciniifoliæ*, Borr.)

S. arbuscula, Koch, etc.

2. Squamæ amentorum fuscæ vel nigrescentes. Folia utrinque nitida, læte virentia, juniora pilis adspersa; venæ conspicuæ, infra maxime prominentes; serraturæ foliorum glandulosæ, stipulæ etiam in ramis junioribus conspicuæ. Pedunculus superne aphyllus; 'ovaria et styli atropurpurei, filamenta cærulea; antheræ violaceæ,' *Koch.* (*Myrsinites*, Borr.)

S. myrsinites, L.
S. procumbens, Forbes, etc.

3. Amenta angusta, pauciflora, serotina, terminalia vel subterminalia; nectarium non raro fissum. Truncus subterraneus. (In *S. Grahami*, Borr., in horto, crassus super terram stratus.) Folia exstipulata. (*Herbaceæ* et *reticulatæ*, Borr.)

a. Pedunculus aphyllus; folia longe petiolata, integerrima, subtus glauca reticulata.

S. reticulata, L.

b. Folia breviter petiolata, pilis adspersa utrinque virentia, crenata; venæ primariæ parallelæ, infra maxime conspicuæ; stylus divisus; pedicellus nectarium tandem superans; nectarium non raro fissum.

S. Grahami, Borr. ms.

c. Folia brevissime petiolata, orbicularia, serrata; venæ prominentes. Pedunculus bifolius, gemmiferus; nectarium sæpe fissum.

S. herbacea, L.

ii. *Sessiles.*

(Pedunculi cum amentis decidui.)

* Rami pruina cæsia tecti. Arbores. (*Pruinosæ*, Koch.)
S. acutifolia, W.

** Antheræ defloratæ, nigræ.
1. Amenta mascula monandra; stylus brevissimus. Folia exstipulata, sæpe opposita, glabra, juniora inflexa. (*Monandræ*, Borr.)
S. purpurea, L., etc.
2. Amenta mascula monadelpha; stylus conspicuus. Folia stipulata, sæpe alterna, infra plus minusve pilosa; folia juniora inflexa. (*Monandræ*, Borr.)
S. Pontederana, Schl.
S. Forbyana, Sm.
S. rubra, Huds.*

*** Antheræ defloratæ, luteæ.
1. Amenta mascula diandra, filamenta plerumque libera, pubes foliorum sericea. Folia juniora semper reflexa; squamæ discolores; nectarium unicum. (*Viminales*, Borr.)
a. Ovarium sessile; stylus elongatus.
α. Stipulæ parvæ.
S. viminalis, L.
β Stipulæ prægrandes.
S. stipularis, Sm.
b. Ovarium pedicellatum; pedicellus nectario subæqualis.
S. Smithiana, W., et
S. acuminata, Sm.†

2. Ovarium pedicellatum; pedicellus nectarium bis terve superans.
a. Folia subtus sericea (ut in *S. viminali*), juniora inflexa, apice recto. (*Rosmarinifoliæ*, Borr.)
S. angustifolia, Wulf.
S. rosmarinifolia, L.
b. Folia subtus nitida, minus sericea, apice sæpe obliquo, juniora inflexa. (*Fuscæ*, Borr., et *ambiguæ*.)
S. Doniana, Sm.
S. repens, L., et
S. ambigua, Ehrh.‡

3. Rami torulosi; pubes foliorum crispula.
a. Folia juniora reflexa. (*Cinereæ*, Borr.)
α. Pedicellus longissimus; stylus brevissimus.
* Gemmæ glabræ.
S. aurita, L.
** Gemmæ pubescentes.
S. cinerea, L.
b. Folia raro reflexa, in siccando nigricantia; pedicellus elongatus, nectarium bis terve superans; stylus elongatus, sæpe bifidus.
S. nigricans, Fr., etc.§

4. Amenta crassa; gemmæ glabræ, prægrandes; pedicellus nectarium quater-sexies superans; stylus brevissimus, subnullus. Folia lata, crenata, subtus tomentosa, venis prominentibus, juniora inflexa. (Inter *Cinereas*, Borr.)
S. Caprea, L.

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* In *S. rubra*, Huds., folia mascula juniora aliquantum reflexa sunt.

† In *S. acuminata*, Sm., folia subtus cinerascentia non sericea; pubes foliorum crispula ut in cinereis.

‡ In *S. ambigua* folia subtus non sericea.

§ In *S. Andersoniana*, Sm., folia juniora plus minusve reflexa sunt.

5. Folia exsiccata, non nigricantia nec reflexa, crassiora quam in *S. nigricante*, Fr., sæpe glaberrima. Stipulæ minores; pedicellus et stylus elongatus, pedicellus nectarium bis terve superans. Ovaria glabra vel pilosa, vel etiam tomentosa.* (*Bicolores*, Borr.)
   S. bicolor, Ehrh., etc.
6. Frutex nanus, ramosus. Folia lata, foliis *S. capreæ* non valde absimilia. Pubes arachnoidea. Amenta terminalia; ovaria glabra; nectarium unicum. (*Hastatæ*, Borr.)
   S. lanata, L.†

RUBUS ADSCITUS, *Genev.*, AND *R. MUTABILIS*, *Genev.*

By T. R. Archer Briggs.

Through the examination of some Continental *Rubi* belonging to Mr. Baker's herbarium, I am now able to assert the identity of one or two well-marked Brambles of the neighbourhood of Plymouth, that do not come in well under any of the "Babingtonianæ" of the Lond. Cat., with named Continental forms. The first of these that I shall notice is a plant named *R. adscitus* by M. Genevier, evidently of the group *Villicaules*, which is common in bushy hedges in low situations, and in damp thickets about Plymouth. It has characters so distinct and well-marked, that I cannot see how those adopting Professor Babington's views can hesitate to regard it as a species, or those falling in with Mr. Baker's arrangement of the *Rubi* in Hooker's 'Student's Flora,' fail to call it a subspecies. It agrees so exactly both with M. Genevier's specimens of *R. adscitus*, and with his description of it in "Essai Monographique sur les Rubus du bassin de la Loire, pp. 116–118, that I give a translation of the latter:—

"*R. adscitus*, G. Genev. Mém. de la Soc. Acad. de M. et L. t. viii. p. 88; Tirage à part, 1er Ess. p. 23. *R. rosaceus*, Bor. Fl. t. ii. p. 192 (non W. et N.); Arron. Not. sur quelques pl. crit. du Morb. p. 27 (1863). Comparer avec *R. micans*, God. et Gr., Fl. Fr. t. i. p. 546.

"Stem with rather blunt angles, the surface on the sides flat or slightly furrowed, striate, rather stout, rough, hairy, with scattered setæ, and unequal, slender, straight, sharp prickles. Leaves 3-nate, often pedate, 4-nate or 5-nate; petiole flat, furrowed at the base, rough, hairy, slightly glandular, with unequal, declining, or slightly falcate prickles. Terminal leaflet with petiole equal to $\frac{1}{3}$ or $\frac{1}{2}$ of its length, broadly oval, with broad base, notched, acuminate, or cuspidate; lateral leaflets with petioles equal to $\frac{1}{8}$ or $\frac{1}{9}$ of their length, broadly oval, acuminate or cuspidate, entire or slightly notched at the base, much dilated and deeply lobed on the outer side; all thin, soft, of a light green, with few decumbent hairs above, deeply toothed, lobed, and serrate; the teeth acute, unequal; of a bright green below, rough, with nearly decumbent shining hairs, or more or less white-felted, the veins raised, midribs prickly. Branches angular, flexuose, very rough, with few glands; prickles unequal, slender, small declining. Leaves 3-nate; petiole not grooved, rough, hairy, slightly glandular; prickles unequal, sharp, declining, the largest falcate; stipules lanceolate, rough, slightly glandular; terminal leaflet with petiole equal to $\frac{1}{4}$ or $\frac{1}{5}$ of its length, oval, narrowed and nearly entire at the base, narrowly acuminate; lateral leaflets shortly stalked, of the same shape, oblique, dilated or lobed on the outer side, much resembling those of the stem in general appearance, but more hairy above, those at the top of the branch sometimes white-felted beneath. Panicle pyramidal, flexuose, compound, diffuse, leafy, very rough with shining hairs, slightly glandular, prickles sharp, declining or sickle-shaped; generally with the three many-flowered lower branches separated, springing from the base of 3-nate leaves, which they do not equal; the two, four, or more succeeding ones from the base of bracts which are at first oval or 3-lobed, then narrower, with long petioles; the upper branches spreading, three or many-flowered, naked, exceeding the bifid bracteoles. Calyx felted, very slightly glandular, neither aciculate nor prickly, greyish-green or ashy, with a straight white edging, sepals oval, gradually narrowed into straight or foliaceous points, often equal to the petals, reflexed after the flowering. Petals very pale pink, oblong, obtuse, jagged or notched at the top, gradually narrowed into a claw, hairy, ciliated. Stamens white, exceeding the greenish styles. Young carpels many, glabrous, forming a large lustrous black fruit. The middle of June, July. Damp woods, wooded hills.

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* Tota facie *S. bicolor* ab *S. nigricante*, Fr., et affinibus ejus recedit; sed ægre id describitur quod primo intuitu plerumque facile dignoscitur.

† *S. lanata* cum *S. hastata* multa habet communia, sed propter amenta sessilia terminalia consociari nequit.

"Obs. This plant is but slightly glandular, and might be classed with the *Virescentes* near *R. piletostachys*. It appears to come very near *R. micans*, God. and Gr., which is distinguished from it by its prickly calyx, petals contracted into a short claw, and some other characters.

"The *R. bicolor*, Arrondeau, Bulletin de la Société polymathique du Morbihan, année 1862; tirage à part, p. 26 (non Mull. et Chab.), seems very close to *R. adscitus;* it is distinguished from it by its small panicle without large bracts, by its flowers being deep pink within, and by the different shape of the leaves of the stem. Its glabrous carpels separate it from *R. racemosus*, and its narrowly acuminate sepals from *R. atrocaulis;* its small flowers, of a bright pink within, distinguish it from these three species."

The above description does so well for the Plymouth plant, agreeing with it even as to the colour of the different parts of the flower, that I feel it to be quite unnecessary to draw up another from local examples. Moreover, the fine French specimens of *R. adscitus* in Mr. Baker's herbarium, from M. Genevier himself, have enabled me to carefully compare the two plants, and I without hesitation assert their identity.

A reference to "British Rubi" shows that Professor Babington considers *R. adscitus*, Genev., and *R. derasus*, Mull., the same, placing both, under the latter of these names, as a variety of *R. villicaulis*. He, however, expresses a doubt as to the correctness of this arrangement on the ground of the possibility of *R. derasus* being a distinct species from *R. villicaulis*. Judging from the specimen of *R. derasus*, Mull., fide Genevier, in Mr. Baker's herbarium, I do not consider it and *R. adscitus* the same, and a note by Mr. Warren, placed with the former, confirms me in this view, as it says "near *Beltardi*."

The most marked features of *R. adscitus* are its narrow, sharp, nearly straight prickles, its broadly oval, irregularly and deeply cut leaves; its long, flexuose flowering shoots; its broad, often cylindrical, panicle, with very blunt end, and long branches, each dividing near the top, at a considerable distance from the rachis, and having its terminal flower-stalk shorter than the lateral ones. The long, narrow points of the sepals, large light pink petals, and greyish-green hue of the whole plant are also remarkable.

This Bramble is common and widely distributed about Plymouth, and the following are among its local stations:—Crabtree; near Rumple Quarry and elsewhere in the Plym Valley; about Plympton and between that place and Plymbridge; at Ivybridge, and in the valley of the Erme, between it and Harford; and at Buckland Monachorum.

Mr. Baker's herbarium contains a genuine specimen of the *Rubus obliquus* of Wirtgen, and this I have compared with the Plymouth plant considered identical by the Rev. A. Bloxam, and described by him in Journ. Bot. Vol. VIII. pp. 69, 70. The points of difference between these two Brambles seem to me very considerable, and I regard the Plymouth one as much nearer the *R. mutabilis* of Genevier. It so greatly resembles this that I shall give a translation of M. Genevier's account of it, for comparison with a description of the English plant, and afterwards notice the points of dissimilarity between specimens of the two; those of *R. mutabilis*, from Genevier himself, in Mr. Baker's herbarium; those of the other in my own.

The following is from pp. 106–108 of Genevier's 'Essai Monographique sur les Rubus du bassin de la Loire':—

"*R. mutabilis*, Gast. Genev. Mém. Soc. Acad. de M. et L., t. viii. p. 84; Arrondeau, Pl. crit. du Morb. p. 29.

"Stem angular or obtuse, reddish, with furrows flat on the sides, channelled at the top, with few silky hairs, very many glandular ones, very unequal declining prickles, some falcate, the longest slender with enlarged bases, placed over the whole surface of the stem, sharp. Leaves 3-nate and pedate 5-nate; petiole finely furrowed, hairy, glandular, with hooked prickles; the terminal leaflet with a stalk $\frac{1}{3}$ of its length, broadly oval, slightly cordate, gradually acuminate; side leaflets with long stalks, oval, dilated on the outer side, narrowed and slightly notched at the base, narrowly acuminate; basal stalked, oval, acuminate, narrowed at each end; all thick, coriaceous, of a deep green, with scattered decumbent hairs above, the teeth broad, spreading, unequal, sharply pointed; grey or silvery-white below, rough, felted, with prominent veins, and prickly midrib. Flowering-shoot bluntly angular, flexuose, slightly hairy, very glandular, with narrow, unequal, declining or hooked prickles. Leaves 3-nate, some pedate 4-nate or 5-nate; petiole flat or finely channelled, hairy, glandular, aciculate, with bent or falcate prickles; terminal leaflet with petiole equal to $\frac{1}{4}$ of its length, broadly oval, sometimes rhomboidal, entire or slightly notched at the base, gradually acuminate; side leaflets with stalks equal to $\frac{1}{10}$ or $\frac{1}{11}$ of their length, oval, gradually acuminate, lobed and dilated on the outer side; all thick, of a fine deep green, and almost glabrous above, with large, shallow, spreading, sharp-pointed teeth; grey or white felted below, more rarely green when the plant is in deep shade, with white, prominent, reticulating veins, midrib prickly. Panicle broadly pyramidal, spreading, compound, branched, lax, leafy, rough, hairy, with red glands, aciculate, with small falcate prickles red at the base, yellow at the top; two lower branches lengthened out, many-flowered, from the base of 3-nate leaves that they do not equal; the succeeding ones many or 3-flowered, from the base of foliaceous bracts that they do not equal; the top ones lengthened out, narrow, small, often single-flowered, from the base of trifid bracts, all furnished with numerous red glands, aciculi, and falcate or declining prickles. Calyx green, tomentose, furnished with numerous red glands, aciculi and prickles; sepals furnished with long foliaceous points, spreading or reflexed after the flowering. Petals bright pink, very distant, oval, narrow, entire or jagged, gradually narrowed into a broad claw, white, hairy on the outside, glabrous within. Stamens white, much exceeding the yellowish styles, very faintly mottled with pink at the base. Young carpels with some very short hairs, soon becoming glabrous, numerous, finally black, shining, slightly juicy. June, middle of July.—On schist and granite. Woods and wooded hills. Maine and Loire: Le Longeron, St.-Léger-du-Bois, Cholet. Vendée: Evrunes, Pouzauges.—Deux-Sèvres: Le Temple, Châtillon, Nueil-sous-les-Aubiers.—Loire-Inférieure: La Haie-Fouassière (de l'Isle); Nantes.

"Obs. *R. mutabilis* is one of the most beautiful and best characterized plants of the genus. In the woods of Pouzauges (Vendée) a plant is frequently met with which is distinguished from this by having leaves green below, panicle narrower, and pedicels for the most part with but one flower; however, it appears to be connected with this plant by intermediate forms. It is near the *R. pallidus* of English botanists, but it is hardly likely to belong to the plant of W. and N."

Having given a translation of Genevier's account of *R. mutabilis,* I append to it a description of the Plymouth plant that I have drawn up—"*Rubus obliquus,* Wirtg.;" Blox. Seemann's Journ. Bot. Vol. VIII. pp. 69, 70 (1870):—Stem arcuate-prostrate or nearly prostrate, rather stout, angular, furrowed, often purplish and mottled with a white glaucous bloom. Prickles tolerably numerous, not confined to the angles, from long compressed bases, strong, slender, slightly declining or patent, purplish with yellow points, very unequal, passing into aciculi. Aciculi numerous, of different lengths, springing from raised bases. Setæ few. Hairs rather scattered. Leaves 5-nate; leaflets rugose, thick, rather convex above; petiole aciculate, setose, hairy, with many small hooked prickles; terminal leaflet with petiole at least one-third of its length, rather broadly ovate, acuminate, points sometimes, not invariably, oblique, slightly cordate at the base, dentate, serrate; side leaflets stalked, ovate- or obovate-acuminate; basal shortly stalked, narrowly ovate, pointed. Leaflets with a few scattered silky hairs above, densely pilose beneath, greenish or white felted, veins prominent. Stipules lanceolate, with long silky hairs. Flowering shoots rather stiff, angular, striate, with numerous prickles, aciculi and long stiff hairs. Prickles of different lengths, declining or slightly hooked, from long narrow compressed bases, slender, sharp. Leaves 3-nate or 5-nate. Leaflets ovate, rather shortly acuminate, terminal one slightly cordate at the base, sometimes with oblique point, serrate, those on the lower part of the stem dentate also, with long scattered silky hairs above, very pilose below, greenish-white or felted. Panicle pyramidal, leafy to near the top, very prickly, aciculate, setose and pilose; rachis rather rigid, branches ascending, stiff, three or four lower ones separated and axillary, top dense, rounded. Sepals ovate, with linear, sometimes slightly leafy points, greenish-white, felted, with small scattered aciculi and setæ, reflexed. Petals narrowly ovate, greenish-white, notched and jagged. Filaments white. Styles greenish. Fruit large, symmetrical, glossy black, well flavoured.

Mr. Baker, in his copy of Genevier's work, has written against the description of *R. mutabilis* "between *R. rudis* and *R. Radula*;" and this is certainly the position of the Plymouth plant. The chief points of difference between specimens of the two are that those of *R. mutabilis* are more setaceous, but less aciculate on the barren stems, the terminal leaflets are more frequently narrowed at the base, though occasionally they have the ovate form usual in the Plymouth plant. The leaves are, as a rule, larger, apparently flatter, more felted and less hairy beneath, but in the latter respect the foreign specimens vary considerably from each other. The panicle of *R. mutabilis* is less corymbose, rigid, and dense at the top; its sepals are considerably more setaceous; and its petals, as is still apparent on some of the specimens, are bright pink, whilst those of the other are white.

The above differences would probably make Continental botanists unwilling to join the two plants together; but I think most British ones, had they the specimens before them that I now have, would join with me in the conclusion that the Plymouth plant is *R. mutabilis*, Genevier.

Although spread over a considerable tract of country about Plymouth, and abundant in some spots, it yet must be considered local, as it is entirely absent from some districts, and has not yet been seen by me in Cornwall. To the stations given for it by the Rev. A. Bloxam in the article referred to above, I can now add the following:—

In the tract of country drained by the Plym.—Lower Mount Gould; Efford Lane; Underwood; near Herdwick Farm, Plympton; between Newnham and Crownhill Down; by Bickleigh Down, and elsewhere about Bickleigh.

In the district of the Tavy.—Between Roborough Village and Axter Gate; on the southern border of Roborough Down; between Plymouth and Tavistock, about eleven miles from the former place.

In that of the Erme.—Near Hemerdon, between Lutton and Sparkewell; Brixton Tor.

SHORT NOTES AND QUERIES.

Botanical Terms.—There exists among English descriptive botanists some discrepancy as to the meaning of certain common terms used to express the outline of leaves. The terms in question are 'lanceolate,' 'oval,' 'elliptic,' and 'oblong.' The conditions defined by the use of these terms are the relative proportion of length and breadth, and certain forms of the base and apex. With reference to 'lanceolate,' the definitions given by our leading systematists agree as to the proportion of length to breadth, that the latter must not be in greater proportion to the former than as 1 to 3; but whilst some define the two extremities as tapering equally, others require that the base shall be broader than the apex, the leaf thus having a narrowly ovate form. The definition in Professor Oliver's 'Lessons,' and in the introduction to the series of Colonial Floras, also given in Mr. Bentham's 'Handbook,' is this latter one; whilst the late Professor Lindley, and the text-books chiefly in use in this country (Dr. Masters', Prof. Bentley's) give the former. In the practice, however, of botanists the use of this term is by no means so strict as their definitions. As to the other three terms, none are defined in the introduction to the Colonial Floras, where it is simply said that they are "compared to the corresponding mathematical forms." This would make 'oblong' a parallelogram; but all that seems to be implied in the term is that the two long sides of the leaf are parallel to some extent: in the proportion of length and breadth there is but little agreement among authorities. 'Oval' and 'elliptical' are doubtless synonymous in geometry, and Linnæus (Phil. Bot.) employed them in the strict mathematical sense; they are still used interchangeably by many botanists to indicate a figure about twice as long as broad, broadest in the middle, and equal at the ends, which may be either rounded or pointed. In Professor Oliver's outline figures, however, 'elliptical' is a figure broader than 'oval' in the proportion of 3 to 2. Other descriptive botanists distinguish between 'oval' with the apex and base graduated to a point, and 'elliptic' with the ends rounded, and the sides more or less parallel. It appears to me that a combination of or compromise between the views of different writers might be effected with advantage, and the four terms made to cover all the forms of simply-outlined leaves equal at both ends in the following manner, in no case giving a *new* signification to a term, though the proposed definition of oval is not that which it originally possessed:—

Leaf tapering from the middle equally to base and apex—
About twice as long as broad = *oval.*
About thrice ,, = *lanceolate.*

Leaf with more or less parallel sides and blunt extremities—
About twice as long as broad = *elliptic.*
About thrice ,, = *oblong.*

Intermediate forms can be expressed by combination of these terms, and forms where either the base or apex is the broader by the use of *ovate* or *obovate*, alone, or in combination with one of the terms above defined. Whatever definitions be adopted, at all events it is very desirable that greater uniformity should be secured than at present exists.—HENRY TRIMEN.

MIDDLESEX PLANTS.—On some waste ground near the new South West India Docks I noticed last month (October) a very large quantity of *Aster Tripolium*, both rayed and not rayed. On the same ground occurred as introductions *Senecio viscosus* and *Xanthium spinosum*. The latter is not given as a Middlesex plant in the published Flora of that county. I may also mention that in 1866 I collected *Xanthium Strumarium* at Chelsea; the latest date in the Flora is 1746, and the plant is bracketed as "probably extinct." I have shown my specimens to Dr. Trimen.—F. NAYLOR.

NOTE ON THE SUPPOSED CERASTIUM PUMILUM FROM JERSEY (see *ante*, p. 199).—As Dr. Trimen has been kind enough to allow me to see some more specimens of the *Cerastium* which he gathered on the sandhills of Jersey, I think it may be as well to state here that, on a second examination, I have found no reason to change my former opinion, and I believe the plant is typical *C. tetrandrum*, not *C. pumilum*. So far as my experience goes, the plant growing on seaside sandhills is always *C. tetrandrum*, whereas *C. pumilum* occurs on calcareous banks, or among the short herbage of the chalk downs near to the sea, but not on the sandhills of the shore.—A. G. MORE.

SIBTHORPIA EUROPÆA IN SUSSEX.—This rare plant has been reported to be extinct in Sussex [Journ. Bot. VI. p. 264; comp. Cyb. Brit. p. 264], but it still lingers in at least one spot on the borders of the county, namely, in the parish of Waldron, about eight miles north of Hailsham, where, by the side of a little stream at the bottom of a deep valley, the writer found it growing sparingly last summer. The locality was courteously pointed out by the Rev. H. Ley, the rector of the parish, to whom it has been long known. Waldron is noted for other botanical rarities, especially the *Phyteuma spicatum*, which grows there abundantly. The beautiful and sweet-scented *Lastræa fœnisecii* is also found there.—A. K. CHERRILL.

A NEW GARDEN LABEL.—The indestructibility of solid paraffin suggested to me its use for the preservation of printed plant labels. The plan having proved successful, and the 'paraffined' labels having resisted the adverse atmospheric influences of two seasons, I cannot but hope that more extended trials will confirm my conviction that a permanent garden label, legible and inexpensive, has been attained. The following is a brief description of the mode of preparing the labels:—Print the names, etc., of the plants on stout, smooth, white paper of suitable dimensions and form. Prepare cast-iron label-holders with a flattened spike to keep them straight in the ground, and with the upper expanded portion so contrived as to have a sunk flat space about a quarter of an inch deep, and the right size for the reception of the printed label and its protective glass cover. Paint this sunk space with several coats of good white paint, and allow it to dry thoroughly. The next step is to unite the label to the glass plate with paraffin. The paper-label and the glass being cut to the same size, the latter is cleaned and kept hot,—about as hot as boiling water,—while the label is being dipped into a bath of melted paraffin. The label is then quickly pressed on to the hot glass, a board and a weight being put upon both. When cold, the glass with its adherent label is placed in the sunk space of the label-holder, and secured with good putty. Subsequently, a coat or two of paint on this putty will keep all secure. The above directions are much easier to carry out than they appear to be at first sight, while several contrivances and precautions will suggest themselves to any one who carries them out on a large scale. For instance, the glass plates may be kept hot in an oven, and removed with a pair of crucible tongs as wanted, while another pair of tongs or pincers will be useful to hold the labels during their immersion in the melted paraffin. Here it should be stated that the best paraffin is that which is freest from any kind of fat or grease, and melts at a temperature at least above 56° Centigrade. It might be found advisable to imbed the label and glass in paraffin, or to modify the plan of fixing the label to the glass by putting it, soaked in paraffin, between *two* sheets, but the principle of all these modifications is identical. The air and rain are excluded, and cannot give rise to the discoloration of the label.—A. H. CHURCH.

FRUIT OF VINCA (pp. 14, 336).—I have before me ripe fruit of *Vinca major*, from the garden of Mr. J. Pristo, of Alverstone, Whippingham, Isle of Wight. I have also, I believe, seen ripe fruit of *Vinca minor* from copses in the Isle of Wight in Dr. Bromfield's herbarium.—F. STRATTON.

DIGITARIA SANGUINALIS NEAR PLYMOUTH.—The Rev. H. N. Ellacombe sends a specimen of *Digitaria sanguinalis*, the true plant, gathered in waste ground in the neighbourhood of Plymouth.—J. G. BAKER.

SILENE NOCTIFLORA, *L.*—I found this plant, in September last, growing sparingly in an arable field adjoining the river Dee, close to the railway viaduct half a mile south of Cefn, in Denbighshire. It is, I believe, new to the county and to the province of North Wales.—F. STRATTON.

ANTHYLLIS DILLENII, *Schultz.*—Has this plant been found of late in a bog near Aberfraw, Anglesea? A specimen of it is in the herbarium of the Royal Institution, Liverpool, dated July, 1853, and collected by the late John Shillitoe.—J. HARBORD LEWIS. [A very unlikely plant to grow anywhere in a *bog*.—J. G. B.]

NOTE ON THE FERTILIZATION OF CEREALS.—I am not aware of any observations on the fertilization of cereals. This year I turned my attention to the subject, from being at work on the Grasses for the third edition of 'English Botany;' and as my residence is in the midst of cornfields, I had ample opportunities of investigating the subject. In Wheat and Barley the stigmas receive the pollen from the anthers before the latter are protruded, and the exserted anthers I found to be always empty. In the Oat most of the protruded anthers are empty, but occasionally anthers with pollen are to be found after protrusion, and stigmas exposed at the sides of the florets, which I have not been able to find in Wheat and Barley. All the British forms of the *Agropyrum* section of *Triticum*, and *Hordeum murinum*, *maritimum*, and *bulbosum* protrude their stigmas and unemptied anthers in the manner usual among the *Euryantheæ*. My observations are confined to the county of Fife, and the case of the Oat seems to show that the mode of fertilization is not always constant in the same species, so that observations are required in other places. The question is more important than it appears at first sight. I have noticed letters in the newspapers from farmers, predicting a bad wheat harvest because the "wind had blown off the flowers." Now, if the anthers may be blown off without affecting the fertilization no harm is done, and the belief of this may save a needless panic and uncalled-for rise in the price of corn.—J. Boswell Syme.

Impatiens fulva in Kent.—I am not aware that *Impatiens fulva* has ever been recorded for the above county, so it may be worth while noting that it is, and has been for at least eight years, extremely abundant on both sides of the little river Ravensbourne, near Lower Sydenham. I have more than once walked along the stream for a considerable distance without losing sight of the plant.—James Britten.

Flora of Marlborough.—The following plants may be added to the list of additions given in 'Journal of Botany,' Vol. VIII. p. 324:—

Diplotaxis muralis !
Nasturtium amphibium !
Thlaspi perfoliatum ! (Savernake.)
Spergularia rubra !
Geranium pyrenaicum !
Melilotus vulgaris !
Orobus tuberosus, β. tenuifolius !
Rosa arvensis, *var.* bibracteata !
Prunus Avium !
Rubus Lejeunii (*fide* Babington).
Epilobium obscurum !
Hieracium sylvaticum !
Senecio sylvaticus !
Bidens cernua !
Arctium minus !
Lactuca virosa !
Vaccinium Myrtillus !
Chlora perfoliata !
Lysimachia vulgaris !
Digitalis purpurea !
Nepeta Cataria !
Lamium incisum !
Scutellaria minor !
Allium vineale, β. compactum !
Lemna trisulca !
Carex fulva !
Alopecurus fulvus ! (Swindon Reservoir.)

Specimens of each have come under my notice while looking through a portion of the herbarium of the Marlborough College Natural History Society; *Camelina sativa* may be added to the list of casuals.—James Britten.

Winter Fertilization.—In the first number of 'Nature' (for Nov. 4th, 1869), I ventured a hypothesis, founded on a series of observations, that plants which flower in the winter have their reproductive organs specially arranged to promote self-fertilization. The following fact seems to confirm this theory:—I recently came upon a late-flowering patch of *Stellaria aquatica*, Scop., on which the following observations were made on two separate occasions, Oct. 21st and 28th. Plants belonging to the Order *Caryophyllaceæ* are, as a rule, so strongly protandrous (see my paper in the 'Journal of Botany' for October, 1870), that cross-fertilization is almost essential. In the present instance, however, I found in almost all the open flowers, of which there were a considerable number, the anthers discharging their pollen at the time when the stigma was receptive, the stigmatic surfaces being brought into immediate contact with the dehiscing anthers in a singular manner. Of the ten stamens five are opposite the petals, while five spring from interpetalar glands. The former rested nearly horizontally on the petals; the latter, structurally the exterior row, because alternate with the petals, inclined forwards into the centre of the flowers; and in some instances the five styles were actually curled round the stamens in a very singular manner. In some flowers on the same plants, as is the habit with this species, the number of styles was reduced to four, or even three; and equally in the case of these unsymmetrical flowers three or four of the stamens stand forward from the rest, to receive, as it were, the embraces of as many styles. There were quite a number of flowers expanded which presented the above features. —ALFRED W. BENNETT. (See also 'Nature,' for October 26.)

ARRANGEMENT FOR CROSS-FERTILIZATION OF THE FLOWERS OF SCROPHULARIA NODOSA.—It is probable that the dichogamy of the flowers of *Scrophularia* has been already observed and published; but it was new to me, until pointed out this season by my assistant Dr. Farlow. The arrangement is this:—In the freshly-opened blossom the upper part of the style is bent forward so as to bring the stigma now ready for pollen, just over the patent lower lip of the corolla; the anthers, not yet dehiscent, are out of sight towards the bottom of the corolla; the filaments being strongly recurved or doubled over. In the blossom a day or two older, the stigma has dried up, the style become flabby, and the filaments have straightened so as to bring the four anthers up to the gorge of the corolla at the base of the lower lip, just back of the now withering stigma; the transversely dehiscent anthers are now widely open. The flowers are visited by honey-bees, which barely insert their heads into the gorge of the flowers; the chin or throat of the bee, coming into contact with the lower lip of the corolla, is necessarily dusted with pollen from the older flowers; and this pollen, in the passage from flower to flower and plant to plant, is inevitably applied to the stigma of the freshly-opened flowers, which alone is in condition to receive it. The nectar sought by insects is here secreted abundantly by the corolla, at its base on the posterior side, and to some extent by the disk which girds the base of the ovary; the posterior face of the scale, which represents the anther of the fifth stamen, is apparently glandular, but hardly, if at all, nectariferous. Bees plunge their proboscis to the bottom of the flower.—DR. ASA GRAY *in Silliman's Journal, August*, 1871.

HYPOCOTYLEDONARY GEMMATION is of uncommon occurrence. My attention has been called by Mr. Guerineau, the gardener of the Cambridge Botanic Garden, to a remarkable instance which occurs in all our seedlings of *Delphinium nudicaule*, the unique red or red-and-yellow-flowered species of California. As this species is now in European cultivation, and a probable variety of it—*D. cardinale*—was raised and figured in England several years ago, the peculiarity in question is likely to have been noted; but I have seen no account of it. In germination the slender radicle elevates a pair of well-formed ovate cotyledons in the usual way. These acquire full development, but no plumule appears between them; consequently the primary axis is here arrested. Soon a nasiform thickening is formed underground at the junction of the lower end of the radicle with the true root; from this is produced a slender petioled 3-lobed leaf, which comes up by the side of the primary plantlet; soon a second leaf appears, and so on, setting up the permanent axis of the plant from a bud which thus originates from the very base of a well-developed radicle, if not from the root itself.—DR. ASA GRAY *in Silliman's Journal, July*, 1871.

Proceedings of Societies.

LINNEAN SOCIETY.—*November* 16*th*.—G. Bentham, Esq., President, in th chair.—Mr. Jansen exhibited specimens of *Centaurea solstitialis*, found in a cornfield above Combe Martin, North Devon. "On the Floral Structure of *Impatiens fulva*, Nutt., with special reference to the closed self-fertilized flowers," by A. W. Bennett. These have been, on the whole, well described and drawn by Professor Asa Gray in his 'Genera of the Plants of the United States,' but the author had observed one or two additional points. In the ordinary conspicuous flowers self-fertilization is absolutely prevented by a membranous wing attached to the staminal tube, which completely covers in the pistil, preventing the access of pollen, and they seldom bear fruit. The minute closed flowers are far more numerous, and are almost invariably fertilized. The regular calyx and corolla are thrown off from the pistil in the form of a cap, resembling the calyptra of a Moss, which the author suggested is caused by the elasticity of the filaments. The stamens are of an altogether different construction from those in the conspicuous flowers, entirely free, strap-shaped in form and with small anthers, containing a very small quantity of pollen. These never dehisce; but, as is often the case with "cleistogenous" flowers, the pollen grains protrude their tubes while still in the anther, piercing its wall to reach the stigma. The "cleistogenous" flowers are more numerous than the conspicuous ones in the proportion of at least twenty to one, and are produced throughout the summer synchronously with them, generally on different plants, occasionally on different branches of the same plant, never on the same branch. The author was unable to detect that the conspicuous flowers are ever visited by insects, and the staminal arrangement seemed to promote absolute sterility rather than cross-fertilization. The paper concluded with some observations by Mr. Darwin, generally in accordance with those of Mr. Bennett, and especially on the point that the two kinds of flowers are distinct from the outset, and that the closed ones are not the result of "arrested development," as held by Professor Gray. The paper was illustrated by a series of drawings. Mr. Bentham referred to the closed flowers of *Viola*, and noticed similar conditions in *Ononis minutissima* and *Salvia clandestina;* in the former of these two, the apetalous flowers, however, appear before the normal ones. "Remarks on *Dolichos uniflorus*," by N. A. Dalzell. "Floræ Hongkongensis Supplementum," by H. F. Hance, Ph.D. The author adds seventy-five species to the published Hongkong Flora. The President remarked on the peculiar richness of the flora in number of species, and the interest attaching to several which have become known only through single specimens, or mere fragments accidentally obtained.

Botanical Society of Edinburgh.—*November 9th.*—Alexander Buchan, M.A., President, in the chair. The President delivered an inaugural address, of which the following is an abstract :—

I propose in this address to make some remarks on climate and weather relative to the geographical distribution of plants, having recently completed certain inquiries regarding prevailing winds and rainfall which are so intimately connected with the subject. In 1847, De Candolle made some researches into the causes which limit vegetable species towards the north in Europe and similar regions, and arrived at the conclusion that every species having its northern limit in central or northern Europe advances as far as it finds a certain fixed amount of heat, calculated from that day of the year when "a certain mean temperature commences to the day when that mean terminates." This law he applied with great ingenuity, in explanation of the northern limit of *Alyssum calycinum*, *Euonymus europæus*, and *Dianthus Carthusianorum*. It is evident that this law can be best tested by applying it to the limits of wheat, barley, the vine, and other cultivated species, since owing to the care taken of them by man in their cultivation, it may be considered that it is climatic conditions alone which set the limits to their distribution. According to Boussingault, wheat requires 8248° F. from the time it begins to grow in spring for the proper ripening of the crop; and moreover, this heat must be so distributed as to secure a mean temperature of 58° during the period when the seed is ripening. This statement referred to the continent of Europe, to which his researches were confined. But we have found in Scotland that a mean temperature of 56° with the average amount of rain and sunshine, is sufficient to ripen wheat properly. Not only so, but the crops of 1864 ripened well with a temperature as low as 54·4 ; in this year, however, the sunshine was much above the average, and the mean of the day temperatures was high. Now whatever be the cause, whether the longer day in Scotland, or the clear sky, or both combined, which brings about the above results, it is clear that in considering the influence of temperature on the ripening of plants, it is not merely mean temperature, but the manner in which this vital element is partitioned during the twenty-four hours which must be taken into account. Now what most influences the mode in which temperature is distributed during the day is the amount of cloud and moisture in the atmosphere, to a knowledge of which the rainfall through the months of the year may be regarded as furnishing the best available key. Indeed, so great is the direct and indirect influence of moisture on plants, that we shall not be far wrong in supposing it to be co-ordinate with that of temperature. De Candolle's researches applied to a region where the climates are determined rather by variations of temperature than of moisture. Not the least valuable of the results he arrived at in applying the law to other regions is this, viz. "On the borders of the Mediterranean Sea, the limits appeared so often determined by the humidity, or by causes still unknown, that the operations of temperature always eluded my calculations." In the climates of this region the rainfall plays a conspicuous part, and hence, as was to have been expected, an assumed climatic limit to species which did not include the rainfall, turned out to be inapplicable to the facts of distribution. Again, perennial species, especially trees and shrubs, are in many cases arrested, or limited, by the absolutely lowest temperatures that occur. The great frost of Christmas 1860 brought us very valuable information bearing on the point. These low temperatures depend to a great extent, no doubt, on the latitude, but they more particularly are determined by the state of the sky and by local situation. If the climate is characterized by a dry calm atmosphere, the loss of heat by radiation during the nights of winter is great, and the temperature falls correspondingly low; and owing to the greater density and consequent weight of cold air, it flows down the slopes of a country which is being cooled down, much in the same way as water, and settles in the low-lying situations. It is well-known that it is in such situations where the destructive effects of frosts are greatest on vegetable forms. Now what we wish to draw possible attention to is this:—of the two conditions, heat and moisture, we have in the distribution of rain a body of facts which will lead to a knowledge of the laws which regulate the distribution of plants more quickly and more certainly than the facts of the distribution of temperature. It is not merely the daily and annual fluctuations of the temperature of a climate which may be inferred from a knowledge of its humidity; it is not merely the greater immediate results which accrue to plants arising from a change in the humidity than rises from a change of temperature; but what especially concerns the question is this vital distinction between the two, viz. as regards temperature, climates range into each other by comparatively nice gradations, whereas on the contrary, the most diverse climates, as respects moisture or dryness, are frequently placed sharply side by side. I have been long impressed with the importance of a knowledge of the rainfall viewed in these aspects, and have recently constructed thirteen maps, showing for each of the months and for the year the rainfall over the greater part of the land of the northern hemisphere. The result of the whole discussion in its relation to climate is very striking. Everywhere the rainfall is dependent on the prevailing winds and on the configuration of the earth's surface; and since the prevailing winds depend on the distribution of land and water over the globe with respect to the heat of the sun, it follows that the present climates of the earth are determined by the relative distribution of land and water, and that with a different distribution we should have different climates. Perhaps nowhere on the globe does there exist such diversity of climate as in America, west of the Rocky Mountains; and there is also very great diversity in India, the region of the Caucasus, and Spain and Portugal. The United States of America, both the prairie and Alleghany regions, British America, the Mediterranean regions, Sweden and Norway, and the south and east of Asia, have peculiar and well-marked climates. Not only so, but even in Russia, there are great differences arising from the different way in which the rainfall is partitioned through the months, especially from May to August. Now it is in those regions which present climates the most diverse from each other, and many of them sharply defined, that the geographical distribution of plants may be best studied, because these climates afford the conditions best suited for tracing the influence of climate in this distribution, and in the changes it effects, or does not effect, on the habits and different organs of the plants themselves. But to develope this part of the subject so as to arrive at some really scientific knowledge of the laws regulating the distribution of plants, it is absolutely necessary that the confusion in our present catalogues of plants be rectified, and that the areas of the distribution of species be stated with a precision much greater than has hitherto been thought necessary. To effect these salutary changes, we must invite the aid of Local Natural History Societies; and botanists will require to give their assistance in supplying us with exhaustive monographs of separate genera, or other naturally allied forms.

The following communications were read:—"On the Zones of *Coniferæ* from the Mediterranean to the Crest of the Maritime Alps." By M. Moggridge, Esq. The following table shows the lowest and highest elevations in feet at which the different species are found:—

	Lowest.	Highest.
Pinus Pinea	0	1046
P. maritima	0	4143
P. halepensis	0	2760
Cupressus sempervirens	0	2300
Juniperus phœnicia	0	4000
Pinus sylvestris	1977	5100
Abies excelsa	1800	3100
A. pectinata	1900	3600
Taxus baccata	2650	2650
Larix europæus	3500	5500
Pinus Cembra	4500	5150
Juniperus communis	0	6300

The starting-points from the coast embraced the line from Monaco to Ventimeglia. "Note on the Therapeutics of *Physalis Alkekenji*." By E. Drummond, Esq. Mr. Drummond states that he is at present engaged investigating the therapeutics of *Physalis*, an almost, if not quite, obsolete drug, which is mentioned by Dioscorides. It possesses in a considerable degree the hypnotic power, which is the main characteristic of the *Solanaceæ*. It is also diuretic, which, perhaps, is due to its sedative influence, relaxing the spasmodic contraction of the capillary vessels of the renal system. It had been used in extreme cases of gouty paroxysm with good effect. "Notes on the York and Lancaster Rose." By Mr. Gorrie. This is described by Parkinson in his 'Garden of Pleasant Flowers,' published in 1656, as *Rosa versicolor*. The specimen now on the table shows this to be a variety of the *Rosa damascena* of Miller; and as its flowers agree with the description there can be no doubt but that it is the true York and Lancaster Rose, which name is now generally applied to the *Gloria-mundi* Rose of the florists, which is of comparatively recent introduction, and a variety of the *Rosa gallica*, or French Rose. "Notes on some Sections of Stems of *Wellingtonia gigantea* grown at Linton Park, Maidstone." By Mr. M'Nab.—A letter was read from Mr. A. Stephen Wilson, in which he stated that he had been occupied for some years investigating certain points regarding the cereal Grasses, and thought it not improbable that the *infelix lolium* of Virgil and others included other species of *Lolium*, and that the ancient farmers may have mistaken ergotized seeds for natural and healthy ones. He had found this season many of the common grasses ergotized, and he intended sowing *Lolium temulentum* in the open field, in order to see whether it is as liable to be ergotized as *Lolium perenne*, and some others. He presented to the Society a series of ergotized British grasses.—Mr. Coutts Trotter noticed the occurrence of *Phyteuma spicatum*, *Melissa grandiflora* and *Imperatoria Ostruthium* near West Plean, Stirlingshire.—Professor Balfour exhibited specimens of *Xanthium spinosum*, a plant which had sprung up in abundance in a pasture field between Canonmills and Borrington after the refuse of a tan-work which had been burnt down, had been spread over the ground. The seeds had probably been introduced with skins or bark.

Botanical News.

On the night of November 1st, died, full of years, William Baxter, formerly Curator of the Botanic Garden, Oxford. Better known to a former generation than to the present, Mr. Baxter's reputation as a gardener and a botanist has been to the present race a tradition of the past rather than a fact of the present. Mr. Baxter was appointed to the Botanic Garden as long ago as 1813, and retired in favour of his son, Mr. W. H. Baxter, the present holder of the office, some twenty years since. In 1817 he was admitted as an Associate of the Linnean Society, and in this present month he sank to his rest in his eighty-fourth year. . . .

When Mr. Baxter was first appointed to the Botanic Garden, Oxford, botany had sunk to its lowest level; Sherard, Dillenius, and Sibthorp belonged to the past. Dr. Williams, who held the chair in the early part of Baxter's curatorship, was an elegant scholar and an amiable man, but added nothing to botanical science; and for practical instruction in botany the undergraduates of that day had recourse to the teachings of Mr. Baxter. Among his pupils were many men who subsequently distinguished themselves in various ways, and some of whom, such as the present Bishop of Chichester, kept up their acquaintance with their instructor up to recent times. It was at this period of his career that Mr. Baxter edited his 'British Botany,' a work in several volumes, devoted to the description and illustration of British plants. The illustrations are of unequal merit, but the amount of information accumulated is extremely large, and bears witness, not only to great shrewdness of perception and accuracy of observation, but to indefatigable zeal and labour. But it was in Cryptogamic botany that Mr. Baxter specially excelled, in this proving himself a worthy compeer of his fellow-labourers, Dawson-Turner, Borrer, Purton, and others. Even to comparatively late years Mr. Baxter retained, in a remarkable degree, his knowledge of Mosses and Epiphyllous Fungi, gained at a time when the number of students in those departments of botany in this country might be counted on the fingers of one hand, and acquired before the compound microscope had become the valuable instrument it now is. But Mr. Baxter did not allow his botanical pursuits to interfere with his practical duties. It is on record that he made great changes for the better in the garden, raised its level so that it was no longer flooded, and stored it with rare plants to an extent that rendered the Oxford Botanic Garden one of the most remarkable of its time. . . .

On the death of Dr. Williams, in 1834, Dr. Daubeny was elected to the professorship, and immediately proceeded still further to improve, and, indeed, remodel the garden. So eager was the Professor to commence operations, and so anxious was the Curator to carry out his views, that, as we have heard, on the very first night of his appointment, the Professor and Curator, lantern in hand, proceeded to the garden, and then and there projected much of the alterations that were subsequently carried into effect, and which, with modifications introduced by the present Curator, have rendered the Oxford Garden, for its limited size, so complete an establishment. . . .

Mr. Baxter had accumulated an extensive library of botanical works, which we presume will now be dispersed.—*Gardeners' Chronicle.*

Dr. Engelmann, of St. Louis, who has studied the genus carefully for many years, has just published an important paper on the classification of the Yucca. In the first place he makes a new genus, which he calls *Hesperaloe*, for a plant first described by Torrey as a doubtful Yucca under the specific name of *parviflora*, and afterwards by Gray as an Aloe under the name of *yuccæfolia*. This has entirely the general habit of Yucca, but differs by its perianth-segments joined at the base, and perigynous not hypogynous filaments. Considering that Aloe is an exclusively African genus, nearly restricted to the Cape, this is probably the best settlement of the matter. The genus Yucca, as thus restricted, he divides into two subgenera, *Euyucca* and *Hesperoyucca*, the former with papillose and the latter with smooth filaments. Hesperoyucca is represented only by *Y. Whipplei* of Torrey, a plant only known in England by very imperfect herbarium specimens. Euyucca he divides into three groups, founded on the fruit,—*Sarcocarpa*, with ruminate albumen, and a sweet, fleshy fruit like a fig (*Y. baccata*, Torrey); *Clistocarpa*, with indehiscent fruit and entire albumen; and *Chenocarpa*, with a three-valved septicidal capsule. Considering how important a character the texture of the fruit gives in *Liliaceæ*, it is of great interest to find such a range here in combination with absolute uniformity in floral structure.

The third volume of Mr. Miers's 'Contributions to Botany' contains a complete monograph of the singular and extensive Order *Menispermaceæ*. The author, who had previously devoted many years of study to the investigation of the structure of the group, first gave a sketch of his proposed classification in 1851 in the Annals of Nat. Hist., and subsequently in the same publication, from 1864 to 1867, published the descriptive matter which is now collected into one volume. No less than 63 genera and 337 species are enumerated and minutely described with that attention to the less obvious characters of the fruit and seed which distinguishes all Mr. Miers's work, and the text is supplemented by 67 quarto plates, all drawn from specimens by the author himself, and full of information to botanists. The volume must be considered one of the most important additions to botanical literature lately published.

We are glad to know that the Rev. R. T. Lowe's 'Manual Flora of Madeira' is in active progress, and that a fourth part, carrying on the enumeration to the end of the *Labiatæ*, will shortly appear.

The fourth part, completing the volume (27th) of the 'Transactions of the Linnean Society' has been issued. It contains two important memoirs in botany, the President's revision of the genus *Cassia*, and Dr. Masters's account of the *Passifloraceæ*. Mr. Bentham's paper, which was read to the Society more than two and a half years ago, gives descriptions of no less than 338 species of *Cassia*, in spite of the reduction of a large number of names to synonyms. These are distributed under three subgenera well distinguished by their anthers and pods, *Fistula*, *Senna*, and *Lasiorhegma*. There is a large instalment of new species, chiefly Brazilian. A very useful appendix—to be imitated, we hope, by all monographers—consists of lists of the Cassias in the chief published sets of plants, with references to their numbers. A sketch of the distribution of the genus over the globe, viewed from the Darwinian stand-point, is prefixed. Dr. Masters's paper is less occupied with technical descriptions of species. The author has worked up the African and American species (the great bulk of the Order) for the second volume of the 'Flora of Tropical Africa,' just published, and the 'Flora Brasiliensis.' Some additional ones are given in the present memoir. In our report of the reading of the paper (p. 24), we shortly alluded to the author's views as to the affinities of the Natural Order, which corresponds to the tribe *Passifloreæ* of the 'Genera Plantarum.' A complete catalogue of the genera (11) and species (225) of the group is given, but the paper is mainly composed of an account of the organography, morphology, and affinities of Passion-flowers, with interesting notes on their fertilization and distribution.

In 'Gardeners' Chronicle' for October 21 is a woodcut and description by Mr. Baker of an interesting new Saxifrage, of the Dactyloides group, called *S. Maweana*. It was discovered by Mr. George Maw, in the neighbourhood of Tetuan, two years ago, and introduced by him in a living state to England, and was gathered again this year by that gentleman, in company with Dr. Hooker and Mr. Ball. It has flowers as large as *S. granulata*, and copious buds in the axils of the leaves, which are three-lobed only about halfway down. If it prove quite hardy, it is likely, from its fine flowers, to become a great favourite for rockwork.

On August 31st the Worcester Naturalists' Club made an excursion to Broadwas, and visited Knightwick. Near the church stands an Oak with Mistletoe growing on it, the only one known in Worcestershire, and making the thirteenth in England. The tree is of moderate size, and probably not more than one hundred years old.

At a meeting of the Winchester and Hampshire Scientific Society on October 16th, the President, Rev. C. A. Johns, exhibited a specimen of *Menziesia polifolia*, gathered by a lady at Bitterne, near Southampton. Mr. Johns had seen the plant growing, but did not venture to pronounce it indigenous on the waste ground where it occurred.

The third fasciculus of the Rev. J. E. Leefe's 'Salictum Exsiccatum' is all but completed, and the author is preparing the fourth fascicle.

We hear, through the 'Gardeners' Chronicle,' that Dr. Hooker has placed the Lichens collected during his Morocco expedition in the hands of the Rev. W. A. Leighton, for examination and determination.

The publication is announced of a new periodical devoted to Horticulture, to be called 'The Garden,' under the editorship of Mr. W. Robinson.

Principal Dawson's paper on the "Fossil Plants of the Devonian and Upper Silurian Formations of Canada," which was read last year before the Royal Society, and an abstract of which was published in their "Proceedings," has been issued entire, in the form of a Report by the Geological Survey of Canada. The memoir is illustrated by 20 plates, and describes no less than 120 "species" of plants older than the Carboniferous period.

Dr. Lindberg, of Helsingfors, has published in the tenth volume of the 'Acta Societatis Scientiæ Fennicæ,' a critical version of all the Mosses that have been figured in the 'Flora Danica.'

The Council of the Royal Society has awarded one of the Royal medals to Dr. John Stenhouse, F.R.S., whose researches on the acids of Lichens have been more than once alluded to in our pages.

Mr. Weir is distributing the sets of Mosses gathered by him in South America, chiefly in Brazil and New Granada, authentically named by Mr. Mitten according to his enumeration, published in the Journal of the Linnean Society. The highest set runs up to 400 numbers. Several sets are for disposal, and any of our readers who wish to subscribe should communicate at once with Mr. Weir, Hadley High Stone, Barnet, Herts.

On Thursday, November 16, Mr. Baker gave a lecture on Agricultural Weeds, at the Public Hall, Reigate, to the members of the Holmesdale Natural History Club and Reigate Mechanics' Institute.

We extract from the 'Daily News' the following case of poisoning by Fungi:—"The Rev. W. F. Welch, vicar of Stadsett, Norfolk, has died under painful circumstances. He found some Fungi by the side of the Thetford Road, which he presumed was (!) eatable. He gave some to a Miss Gibbs, and took some home himself. On the following day both Miss Gibbs and the rev. gentleman ate some of the Fungi, and in a few hours they were seized with vomiting. Mr. Welch appeared for a time to revive, but dangerous symptoms again presented themselves, and after a few hours of renewed suffering he died. Miss Gibbs is recovering."

In our third volume (p. 28) will be found a notice of the raising of a heavy slab of paving-stone in the Goswell Road by a large mass of *Agaricus (Tricholoma) cartilagineus*, Bull. The same species has been recently performing the same feat in Whitehall Gardens. Mr. D. Wooster, our informant, says, "I had several times noticed that the flagstones were being raised by something from beneath, and on the 13th of October I found three men engaged in taking up the raised flags, when masses of the Agaric were discovered to be the cause of the upheaval. Some of the flags raised were of good size, and must be of considerable weight." We may add that the Agaricus had developed its gills and fructification, whilst the plant in the Goswell Road was but a mass of mycelium.

In the third part of volume thirteen of the 'Nouveaux Mémoires de la Société impériale des Nat. de Moscou,' M. Kauffmann has published an account of the Sumbul root of Persia. This has been for some time known to be the produce of some umbelliferous plant. A living root has been obtained at Moscow, and has now produced flowers and fruit in the botanical gardens there. M. Kauffmann considers it the type of a new genus, which he has named *Euryangium*, the plant he names *E. Sumbul.* The paper is illustrated by two folio plates. (See also ‘Pharmaceutical Journal,’ 1871, p. 807.)

CORRECTION.—P. 276, line 16, instead of “glued to the *same* sheet,” read “glued to *another* sheet”; p. 296, line 18, for “1868,” read “1865;” p. 298, line 12 from bottom, for “Belhan, fl.” read “Belhan, pl.”

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